TROTEC ®

LogControl DL Software
Operating Instructions

Version 2.0.4.45

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1. Introduction

Supply pipes that transport vitally important commodities like drinking water, for example, needed to be checked and monitored especially thoroughly and extremely carefully. Prevailing pressure values provide valuable information with regard to fire protection and the sustainability of supplies.

In order to ensure that such supplies are indeed as sustainable as they should be, including during peak times when demand is at its greatest, measurements have to be carried out using pressure loggers.

In such cases, pressure loggers are installed at certain positions or specific intervals along the section of pipe in question. Whenever water is taken from the pipe, a drop in pressure occurs. The pressure profile over this measurement section provides the user with extremely important information concerning the condition of the pipes that are being monitored. In addition, the measuring results can be displayed in a diagram so as to provide a graphic illustration of the pressure values as determined by the individual loggers.

In order to provide you, the user, with the best possible support and to ensure that you get the maximum benefit from your product, we have developed the LogControl DL software, which has been designed specifically to assess the measuring data which the receivers have collected. The software also enables you to program a pressure logger to carry out a measurement. The measuring data that has been read out can then be displayed as a measuring curve. In addition, different measuring curves can be overlapped and measurements can be exported to Excel for further processing.

2. Program Configuration

2.1 Main Menu

There are a number of menu options available which enable you to control the program functions.

Figure 2-1: Main menu

In the *"File"* menu you will find a number of program functions which enable you to save or load measurements. You can also use this menu option to end the program.

You can go to the menu item *"Settings"* to change different program characteristics.

Among the more important features which can be changed using this menu are the language and the graphic depiction of the diagram. In addition, you can also change the configuration of the communication parameters which control the data exchange between the readout units. Furthermore, you can reach the GSM modem administration mask via this menu.

The last menu item enables you to call up the *"Backup assistant"*. The backup assistant is necessary in order to be able to initialise and update the database.

You can change between the program's two different transfer modes in the *"Mode"* menu.

The *"Serial/USB mode"* is the standard mode which was previously used in the program. This mode can be used to control the readout circuit boards which are connected to the USB. The *"GSM mode"* is designed to enable you to read out pressure loggers which are equipped with a GSM modem.

The GSM modems must first be configured and registered with the program. You can carry out modem setting configurations via the menu item *"GSM modem list"* in the *"Settings"* menu.

The *"Help"* menu allows you to access all information regarding contact data, the program version and hardware information of the readout circuit board.

You will find a detailed description of the individual menu items in chapter 3 ("Main Menu").

2.2 Toolbar

The toolbar, which you will find under the main menu, provides you with a variety of shortcuts and useful functions (see fig. 2-2). The functions are, however, limited to a specific context and are therefore not always available. If a function cannot be used in a certain context, it will appear on the toolbar as a grey icon.

See chapter 3.5 ("Toolbar") for a detailed description of the individual functions.

Figure 2-2: Status bar

2.3 Status Bar

The status bar (see fig. 2-3) provides you with information regarding the history of the functions that have been called up. This appears both in the form of a text describing which tasks have been performed as well as a progress bar which provides the same information in graphic form.

Figure 2-3: Status bar

2.4 Sectors

There are two different sectors with different functions in the LogControl DL program. The two sectors, *"Pressure logger and measurements"* and *"Measuring curve"*, provide the user with a variety of different context related functions.

2.4.1 Pressure Logger and Measurements
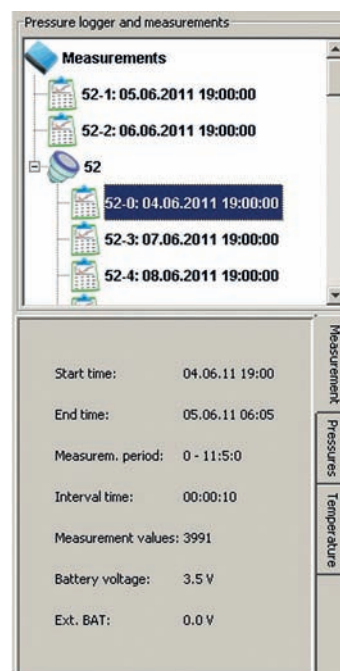
This sector of the program shows all the measurements that have been saved into the database, as well as all the measurements on the data logger readout circuit board and all new measurements (see fig. 2-4).

You can select either a measurement or a pressure logger to gain more detailed information on either of the two. The information appears below the sector *"Pressure logger and measurements"* and provides you with additional data on the object you have selected *(see table "Additional Information")*.

You are also able to access the context related functions of the toolbar in this sector when you have selected an object.

Figure 2-4:
"Pressure logger and measurements" sector

When you select a pressure logger, you are able to access the buttons from 1 to 6 in the toolbar (see fig.2-2). You are able to access the buttons from 7 to 9 and 11 to 15, which are designed to provide the user with a series of additional functions when you select a measurement.

See chapter 3.5 for more information on the individual functions.

Measurement	Pressure logger
Start time	Serial number
End time	Measurement values
Measuring period	Measurements
Interval time	Software version
Measuring values	Pressure sensor
Battery voltage int. / ext.	Calibration
Min. air pressure / Max. air pressure	Battery voltage
Absolute max. / Absolute min.	
Absolute difference	
max. pressure / min. pressure	
Pressure difference	

Table: Additional Information on Measurements / Pressure Loggers

2.4.2 Measuring Curve

In the *"Measuring Curve"* sector, the values of the pressure logger are displayed as a diagram. The type of diagram displayed is a line diagram.

The individual pressure values are entered into the Y-axis and the time is entered into the X-axis (see fig. 2-5).

The time is depicted on the x-axis as a measuring curve with the units hours, minutes and seconds (hh:mm:ss).

If several measuring curves are to overlap, the units can also be in months and years, depending on how far apart the starting times of the individual measurements are.
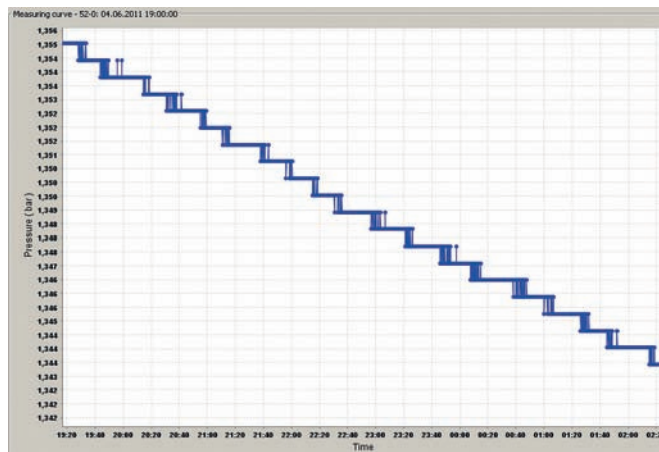

Figure 2-5: "Measuring curve" sector

Additional functions in this sector can be accessed via the buttons as shown in fig. 2-5.

If the displayed view is of a single measuring curve, then you can click on the buttons *"Divide"* or *"Calculate"* to divide the measuring curve up into two or more curves or to calculate the pressure difference between a maximum and minimum measurement.

If the displayed view is of two or more measuring curves, you can click on the buttons *"Overlap"* and *"Mark"* to either overlap different measuring curves or select data information which you would like to export to Excel.

See chapter 4 for more detailed information on the individual functions in this sector.

3. Main Menu

The individual menus and their respective sub-menu items are described in detail below:

3.1 "File" Menu

File	
Open	Strg+O
Save as	Strg+S
Additional information	Strg+A
Finish	Strg+E

3.1.1 Opening a File

From program version 1.0.1.5 onwards, you are able to save data into a separate file. This allows you to exchange measurements with another LogControl DL program version if necessary.

To open a file which always has the ending *"dfl"*, select *"File"* > *"Open"* in the menu or press the key combination *STRG + O*. A dialogue allowing you to select the file you wish to open will appear. Click on *"Open"* to load the file.

Please remember that due to the fact that there are different versions of the LogControl DL program not all *"dfl"* files can be opened with each program version. The latest program version, Version 1.0.3.20, for example, is always able to access saved data including that of the all predecessor versions (1.0.1.1 to 1.0.2.17). The predecessor versions, however, are not able to access the data that has been saved by later versions.

Depending on the size of the measurement, loading can take a few seconds to complete. The file can then be seen in the sector *"Pressure logger and measurements"* (chapter 4.1).

When the file has been opened, the measuring data is saved into the database and will be shown every time the program starts. You can delete the measurement as described in chapter 3.5.11 if you would prefer not to have the data displayed every time the program starts.

3.1.2 Saving a File

In order to be able to load measurements, the measuring data mentioned above must have the suffix *"dfl"*. Such files can either be created by either clicking on the menu item *"Save"* or by pressing the key combination *STRG + S*.

First mark the measurement which you would like to save as described in chapter 4.1. When you have marked the measurement, the menu item *"Save as"* in the *"File"* menu becomes available. Click on the menu item.

When this function has been called up, a dialogue appears which allows you to enter the file path and the measurement. Click on *"Save"* when you have entered a file name and the relevant file path so that the measurement can be saved into the new file.

When a measurement has been saved, it is still available in the sector *"Pressure logger and measurements"* (see chapter 4.1.). If you would not like the measurement that has just been saved to appear in this sector, you can delete the measurement as described in chapter 3.5.11.

3.1.3 Entering Additional Information

You can also add additional information to each individual measurement in the database as described in chapter 4.2.3.

From the program version 1.0.1.5 of the LogControl DL program onwards you can also easily access this information window via the menu item *"Additional information"* in the *"File"* menu. You then only have to select the relevant measurement as described in chapter 4.2.3.

3.1.4 Ending a Program

Select **"File"** > **"Finish"** or press the key combination **STRG + E** to end the program. You do not need to save the measurement explicitly as it is saved by the program automatically.

Only measurements with a red exclamation mark will not be saved because an error occurred while they were being read out.

3.2 "Settings Menu"
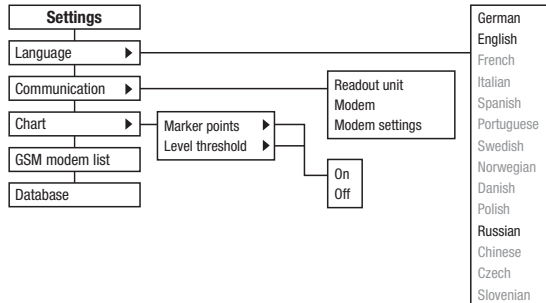
3.2.1 Language

Go to the menu **"Settings"** > **"Language"** to change all texts and textual presentations to the language of your choice.

The program supports up to 14 languages. The language packs, which can be used immediately after the program has been installed, are integrated in the program and cannot be changed.

As a result you can only select from the languages that are available from the **"Language"** menu when the installation has been completed. A so-called language file has to be created first for other languages.

In order to make it easier for you to customise your program, the program creates a template of the language file during installation. The template is in the *"lang"* folder. The *"lang"* folder is in the installation directory of the LogControl DL program.

If, for example, you have installed the program under *"C:\Programs"*, then you will find the installation directory under *"C:\Programs\LogControl DL"* and the template for the language file under *"C:\Programs\LogControl DL\lang"*.

When you open the *"lang"* folder, you will see the template with the name *"Language.properties"*. This file can be opened and processed using either Editor or WordPad.

Before you can process the file, you have to create a copy of the file *"Language.properties"* in the same folder. This is because the template itself should not be changed in order to prevent errors from occurring in the program.

You must therefore never change the template, only the copy!

To create a copy of the file, mark the file by left clicking on it and then mouseover the marked file and right click.

A so-called popup menu appears. Select the option **"Copy"** and left click again.

The copy of the file must be added to the same folder. Go the **"Edit"** menu and select the command **"Paste"**.

The *"lang"* folder should now contain a further language file with the name *"Copy of Language.properties"*. This copy can now be customised to suit your language.

When you have finished customising the file, the name of the language file must also be customised for the program so that it can identify the file and load it. Use the following conventions to designate a name for the copy of your language file *"Copy of Language.properties"*).

- French > *"Language_fr_FR.properties"*
- Spanish > *"Language_es_ES.properties"*
- Italian > *"Language_it_IT.properties"*
- Danish > *"Language_da_DK.properties"*
- Norwegian > *"Language_no_NO.properties"*
- Swedish > *"Language_sv_SE.properties"*
- Portuguese > *"Language_pt_PT.properties"*
- Polish > *"Language_pl_PL.properties"*
- Russian > *"Language_ru_RU.properties"*
- Chinese > *"Language_zh_CN.properties"*
- Czech > *"Language_cs_CZ.properties"*
- Slovenian > *"Language_sl_Sl.properties"*

3.2.2 Communication

In the version 1.0.3.2, the menu **"Communication"** was expanded and now contains configuration parameters for GSM communication.

In contrast to the menu item **"GSM modem"**, which is described in more detail in chapter 3.2.4, hardware components which are connected to the computer are configured via these menu items.

These include the readout units which are used to read out the pressure loggers and modems which are needed to set up a connection to the pressure loggers.

The interface parameters must be configured before you can import the data from the pressure logger into the LogControl DL program. The readout unit is connected to the computer via the USB port and creates a virtual serial interface called *"COM port"* in the operating system.

When you click on the menu item **"Settings"** > **"Communication"** > **"Readout unit"**, the dialogue as shown in figure 3-3 appears. COM port can be selected in the first box. The following parameter settings for the COM port should be regarded as standard values and should therefore be set accordingly.

Click on **"Save"** to save the settings. The pressure logger can be read out as described in chapter 3.5.1.

If you are unable to select a COM port after the readout unit has been connected and the LogControl DL program has been started, the hardware driver must first be installed. Please end the LogControl DL program and install the USB driver from the installation CD.

A further possible reason which would explain why the COM port is not shown in the dialogue is a change in the Java environment. This could other be because Java has been updated or installed again.

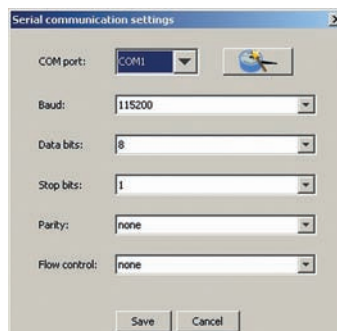Please end the LogControl DL program and execute the **"ComFixPatch"** from the installation CD.

Figure 3-3: "Serial communication settings"

In order to be able to communicate with the pressure logger, which is read out via a GSM modem, the program needs a modem to set up a connection between the program and the GSM modem.

The connection to such a GSM modem can either take place using either a cable modem or a GSM modem.

As was the case with the readout unit, the interface parameters for the modem that is connected to the computer also have to be configured first.

In order to do so, click on the menu item *"Settings" > "Communication" > "GSM modem"*. A dialogue like the one used to configure the readout unit appears. The only difference between the two dialogues is the parameterisation of the interface settings.

The COM port is dependent on the operating system in this case too and is also named by the system although this is different from the readout unit.

If you have bought a modem from Trotec to communicate with the logger, then you can use the following parameters which can be regarded as standard values to configure the interface.

- *Baud:* 9600
- *Data bits:* 8
- *Stop bits:* 1
- *Parity:* none
- *Flow control* none

Go to the menu item *"Settings" > "Communication" > "Modem settings"* to get to the dialogue as shown in figure 3-4. The dialogue contains the initialisation parameters which are sent to the modem that is connected to the computer while the link is being connected.
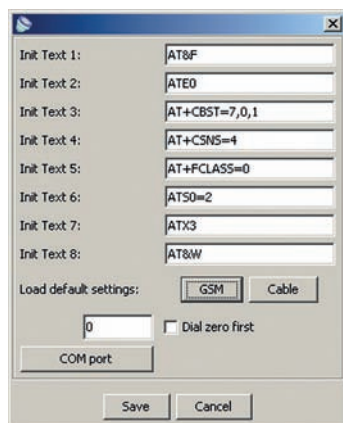

Figure 3-4: "Modem settings" dialogue

If you have bought a modem from Trotec, you can use either the *"GSM"* or the *"Cable"* button to call up the standard parameters. The designation of the buttons reflects the type of modem which is connected.

Furthermore, you can use this dialogue to communicate the prefix for the outside line if you wish to operate it as part of a telephone system.

If, for example, you need to dial "8" to get an outside line, enter "8" into the box before the check box *"Dial zero first"*.

Then click on the control box. A tick will appear. From now on an 8 will precede any telephone number that is dialled to get an outside line.

All the changes that are performed in this dialogue can be saved by clicking on the *"Save"* button or rejected by clicking on the *"Cancel"* button.

3.2.3 Diagram

You will find all functions which could have in some way have an effect on the diagram in this menu.

Go to the menu item *"Settings" > "Communication" > "Marker points"* to show or hide the measuring points. The measuring points will either be shown as small filled circles, or if you have selected the option *"Off"*, as connecting lines between the individual measurement values.

The second menu item *"Settings" > "Communication" > "Threshold values"* is designed to hide the threshold values when operation controlled measurements are carried out. That means that the threshold values which are depicted as chain lines are not shown in the diagram when the menu item *"Off"* has been selected.

3.2.4 GSM Modem List

A general depiction of the information flow between the program and the pressure logger can be seen in figure 3-5.

As you can see in this depiction, two modems are involved in GSM readout. One is connected directly to the computer and the other is connected directly to the pressure logger.

The settings of the modem that is connected to the computer via a cable and that is referred to in figure 3-5 as the cable modem can be changed using the menu *"Settings" > "Communication"* This modem is in contrast to the GSM modem completely autarkic with regard to program settings.
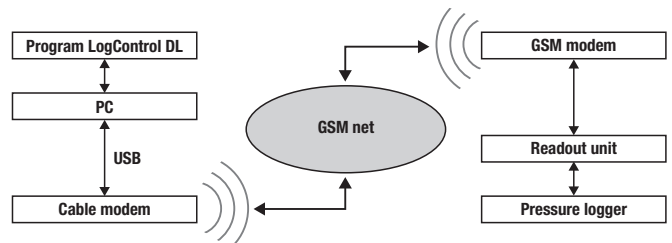
Figure 3-5: GSM set up diagram

The settings for the GSM modem, which enable the pressure logger to set up a connection via the GSM network, can be configured using the *"GSM modem online times"* dialogue as shown in figure 3-6. You will find more information on this subject in the following chapters.

The window is divided into three main sectors. The first sector is the toolbar which enables you to access functions that allow you to read information like *"SIM ID"*, *"Time"*, *"Battery voltage"* and *"Error memory"* out of the GSM modem.

The second sector is in the left-hand part of the window below the toolbar and shows the GSM modem connection parameters as stored in the database. The third and final sector is to the right of this sector. The third sector is used to configure and save modem online times as well as to change the parameters of the SMS status messages.

Figure 3-6: "GSM modem online times" dialogue

In order to be able to program or change the online times the modem has to be connected to your computer via the USB cable included in the scope of delivery.

The connection between the modem and the program has to be configured as a *"readout unit"* as described in chapter 3.2.2.

In order to do so you must first press the key on the modem before you connect the modem to your computer using the USB cable. When you press the key, the modem's green LED starts to blink to indicate that the modem is ready to communicate.
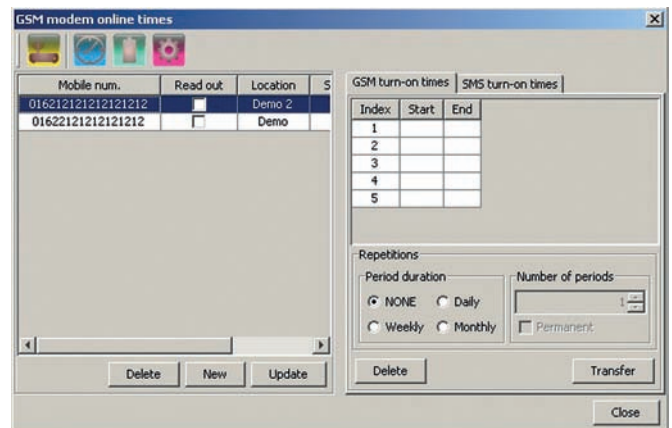
Now you can connect your modem to your computer and configure the interface between the program and the modem. After that you may call up the dialogue *"GSM modem online times"*.

Toolbar

As shown in figure 3-6, and as explained previously, you will find four functions in the toolbar of the *"GSM modem online times"* dialogue.

The first function on the toolbar enables you to read out the modem's SIM ID.

When the information has been read out and there is a data set with the SIM ID that has just been read out in the database, then the data set is marked in the table along with the modem online times providing these have already been configured. If there is no data set with the SIM ID in the table, then the dialogue as shown in figure 3-7 will appear.
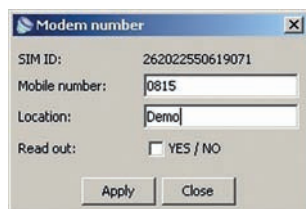

Figure 3-7: "Modem number" dialogue

You can enter the mobile number as well as a short text regarding the location of the modem in the *"Modem number"* dialogue You can make the modem to build up a connection with the pressure logger (see chapter 3.5.1) by ticking the *"YES/NO"* box.

If you do not tick the box, the program will only read out the pressure logger when the connection times of the pressure logger modem are identical with those of the computer.

Click on *"Apply"* to save the data into the database. If you do not wish to save the data, then click on *"Close"*.

The second function can be used to change the modem time. When you click on the button, the program reads out the current modem time and displays this time in the dialogue. Change the time in this dialogue if necessary and click on *"Save"*.

The third function in the toolbar can be used to gain information on the battery status of the modem. Click on the button to see the voltage level of the internal and external battery.

The fourth function on the toolbar enables you to read out the error memory of the modem. The error memory contains all relevant information on individual dial ups. Any significant incidences regarding the power supply are also written into the error memory.

Left sector

As explained above, the available modems are listed in the left-hand sector of the *"GSM modem online times"* dialogue.

In this context available means the modems can be queried by the program when the telephone number has been entered into the *"Modem number"* dialogue (see fig. 3-7) and the dial up times have been configured. The table also displays all information contained in the dialogue as shown in figure 3-7.

Click on *"Delete"* to remove a data set from the table, i.e. delete modem settings from the program.

Click on *"New"* to enter a new data set into the table manually. The program will then attempt to read out a connected modem. What the program actually does is try to identify the SIM ID. If a modem is not available, the *"Modem number"* dialogue opens without automatically entering an SIM ID. You can now add the missing information and click on *"Save"* to apply the data to the table.

Click on *"Update"* to update a data set which has been marked in the table with new data from a modem. Connect the modem to your computer so that the pressure logger can be read out at the modem as described in chapter 3.5.1. When this has been completed, you can open the dialogue and select a data set in the table and then click on *"Update"*. The so-called online times (dial up times) and the text message settings are then updated.

Right sector

The right-hand sector of the dialogue is divided into *"GSM turn on times"* and *"SMS turn on times"*. Because the GSM modem is only equipped with rudimentary text message support, these operating instructions will not deal further with this part of the program.

The sector *"GSM turn on times"* enables you to program up to five time frames into the modem. The time frames have a date and time at which they start and a date and time at which they end.

Double click on one of the lines in the table to open the dialogue as shown in figure 3-8. You can use this dialogue to enter both the starting and ending times of the individual time frames. Please ensure that time frames do not overlap. If, for, example, two time frames do overlap, then neither of the time frames will be transferred to the modem.
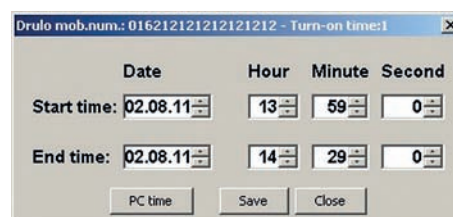
Figure 3-8: "Programming the time frame" dialogue

When you click on the *"PC time"* button, the boxes which display the current computer time appear. You can either press *"Save"* to store any new settings or *"Close"* to end the dialogue without carrying out any changes.

You can change the values in the individual boxes by either selecting a certain figure or by pressing the arrow keys to the right of the boxes until you have reached the value you wish to enter.

Below the table in figure 3-6 you can see the segment *"Repetitions"*. In this sector you can change settings regarding the dial up times, i.e. the dial up times you have entered can be repeated at selected intervals.

If you have selected the box *"NONE"*, the measurements will only be carried out at the previously selected time. If you select the box *"Daily"*, the measurement will be repeated on the following day.

You can determine the number of repetitions by entering a number into the *"Number of periods"* box. The number of repetitions can range from one to a theoretically infinite number if the box *"Permanent"* has been selected.

Please note that the settings are initially saved into the database and not immediately into the modem.

The settings have to be transferred explicitly to the modem for them to be saved there. In order to do so click on *"Apply"*.

When they have been transferred, the program will show you how many measurements have been saved into the modem.

If the number of saved measurements is different to the measurements in the table, then there has been an overlapping of dial up times. You should remedy the situation and transfer the online times to the modem again because the modem is only online at the dial up times that have been entered.

3.2.5 Database

In the menu *"Settings"* > *"Database"*, you can use the database assistant to either reinitialise the database or to carry out a software update or to update the database.

Furthermore, you can use the database's backup assistant to create a backup of your data which will allow you to restore the data if necessary.

1. Database Initialisation

Start the database assistant via the menu *"Settings"* > *"Database"*. The window *"Database initialisation"* then opens.

Click on the *"User"* button to enter the user name and the password that will allow you to access the database (see fig. 3-9).
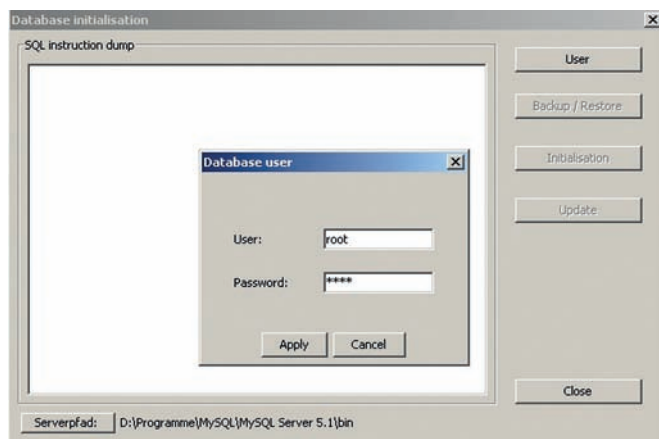

Figure 3-9: Entering the database user

Confirm by clicking on *"Apply"* and then on *"Initialisation"* to start creating a table. If you do not wish to perform a database initialisation, click on *"Cancel"* and then on *"Close"*.

⚠ Attention: Be sure to only perform an initialisation of the database when you have installed the program for the first time. This is because the existing database will be recreated and all previous measurements will be lost.

You will receive a message warning you that a database exists (fig. 3-10).

Confirm by clicking on *"OK"* so that you can continue with the assistant. Remember that all the values that have previously been saved into the database will be lost. Click on *"Cancel"* if you would like to stop the database initialisation procedure.
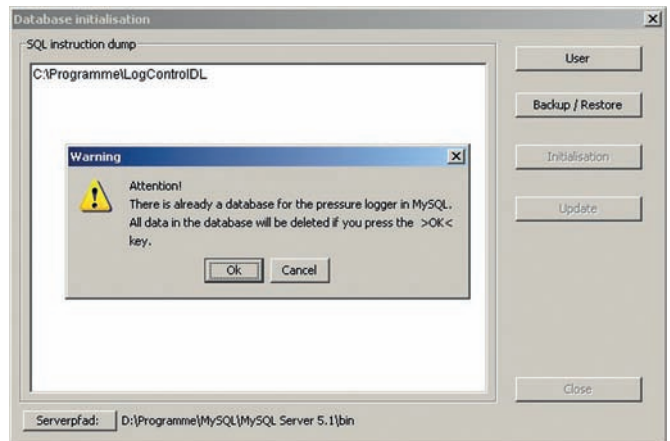

Figure 3-10: Warning!

2. Updating the Database

In some cases you may have to update the database after you have carried out a software update. A message will then appear informing you thereof. When you update the database, all previously saved values remain in the database. Click on *"Update"* to begin the database update.

Possible error messages during the procedure

Error message 1:
The assistant cannot find the correct path.

Check to see if the path you have entered exists. If this is not the case, try to install the software again or contact Trotec.

Error message 2:
The program was not able to set up a connection to the database. This could be because the wrong password was entered, *"MySQL"* was either terminated or not started properly or the database is blocked by a firewall.

Ensure that you have entered the correct password and check to see if *"MySQL"* has been started properly. Deactivate your firewall for the duration of the update if one is installed.

3. Backup Assistant

You can use the backup assistant to create a backup of the database or to restore your data using a back up file which you have already created. A backup file contains all the measuring values which were in the database at the time the backup was performed.

Please note that some measurements may be lost when a backup file is used to restore data. This is because the contents of the database as well as the configuration file are overwritten by the data which was saved when the backup was performed. We therefore recommend that you perform a backup at regular intervals in order to ensure that your database always contains the latest data.

Select the menu *"Settings"* > *"Database"*.
The dialogue window *"Database initialisation"* will then appear.

You will also need administrator rights to access the database. Select the *"User"* button and enter the user name and the password that is required to access the database into the *"Database user"* window. Click on *"Apply"* to confirm and then on *"Backup/Restore"* to start the backup assistant.

⚠ Attention: Before the backup assistant is used for the first time, the program must be informed about the MySQL installation directory so that the assistant is able to perform a backup. Select "Server path" at the bottom left-hand corner in the "Database initialisation" window.

A dialogue window in which you have to enter the relevant installation path of the *"mysqldump.exe"* file will open. If you have installed MySQL under *"C:\Programs\MySQL"* for example, then you will find the directory of the *"mysqldump.exe"* file under *"C:\Programs\MySQL\bin"*.

When you have selected the directory, the required file will appear in the dialogue window. Mark the file and click on *"Open"*. The path will appear to the right of the button *"Server path"*.

When you have started the backup assistant, a window will appear as shown in figure 3-11. You can now select either the *"Backup"* or *"Restore"* button in the left-hand navigation bar to call up the relevant functions. The information in the right-hand part of the window depends on the context and changes according to the selections which have been made.
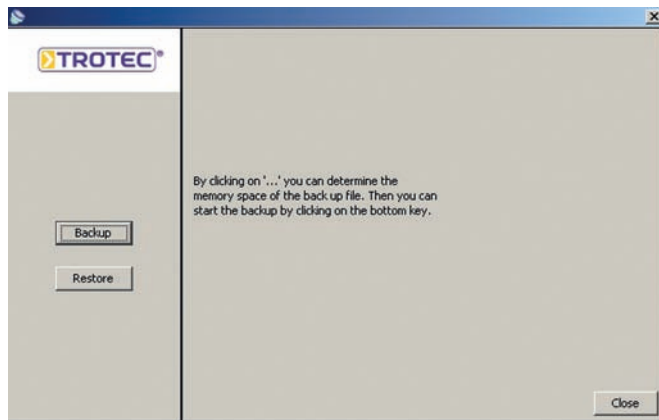

Figure 3-11: Backup assistant dialogue window

a) How to Backup Data

Click on *"Backup"* in the left-hand navigation bar to perform a backup. Select the memory place for the backup file (fig. 3-12) above the button *"…"*. The *"Restore"* button cannot be selected during this procedure.

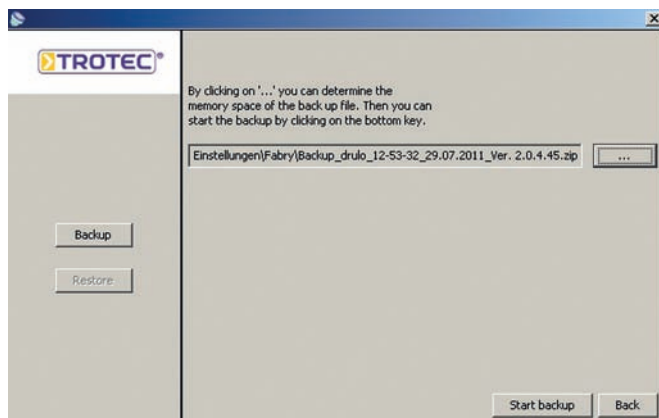Click on *"Back"* to return to the back up assistant dialogue window.

Figure 3-12: "Backup" assistant

A back up can only be started when a memory place for the backup file has been selected. If you select *"Backup"* without having previously selected a memory place, then you will be requested to do so by the program. Click on *"OK"* to close the request and select a memory place for the backup file using the *"…"* button.

A window in which you can enter the path where the backup file is to be saved will open. The program automatically assigns a name to the backup file. The name comprises the name of the program, the current time and date and the version of the Log DL program.

Example: Backup_LogControlDL_08-45-28_08.11.2010_Ver. 1.0.5.30.zip

Click on save. The path you have selected for the memory place appears in the text box (fig. 3-12).

In addition the program generates and attaches a file. Now you can click on *"Start backup"* to create a backup file. A message will appear when the backup has been completed. Finish by clicking on *"OK"*

Click on the *"Back button"* to return to the backup assistant dialogue window.

b) How to Restore Data

Click on *"Restore"* in the left-hand navigation bar to restore data. Click on the *"…"* button in the right-hand part of the window to select the backup file which you require to restore the data (fig. 3-13).

The *"Backup"* button cannot be selected during this procedure. Click on the *"Back"* button to return to the backup assistant dialogue window.
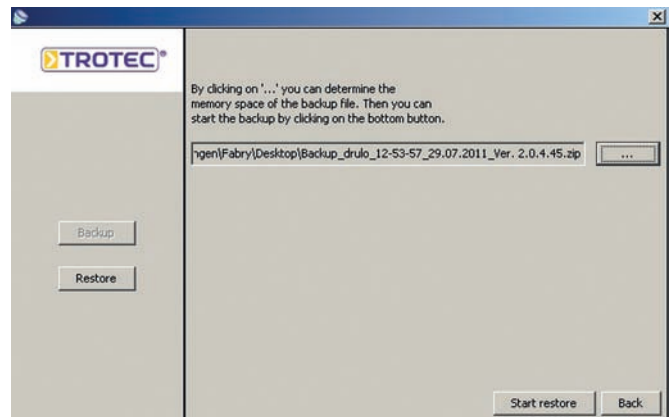

Figure 3-13: "Restore" backup assistant

A restore can only be started if you have selected a backup file first. If you select *"Start restore"* without having previously selected a backup file, then you will be requested to do so by the program. Click on *"OK"* to close the request and select a backup file using the *"…"* button.

A dialogue window opens. Select a backup file and click on *"Open"*. The name of the file appears in the text box (fig. 3-13). Click on *"Start restore"* to commence the procedure.

Please note that all program relevant data in the LogControl DL directory as well as all the values in the database will be deleted and written over with the backup data. A message informing you thereof will appear. Click on *"Yes"* to continue to restore the data or *"No"* to return to the previous window.

If you have selected an invalid backup file, you will not be able to continue to restore the data. An error message will appear. Click on *"OK"* and select a valid backup file.

If the version number of the backup file (the last position in the file name behind the date the file was generated) is different to the current program version, then you will also be unable to restore the data.

An error message will appear. Click on *"OK"* to close the message and select a valid backup file.

Click on *"Start Restore"* to resume restoring the data. The LogControl DL directory and the database will be written over by the backup file.

A progress bar will inform you of the status and a message will appear when the data has been restored successfully. Click on *"OK"*. The procedure has now been completed.

Click on *"Back"* to return to the backup assistant dialogue window.

Program version	Backup File	
1.0.**3**.21	1.0.**3**.20	Restore possible
1.0.**3**.21	1.0.**2**.17	Restore not possible

3.3 "Mode" Menu

```
┌──────────────────────┐
│         Mode         │
├──────────────────────┤
│       GSM Mode       │
├──────────────────────┤
│   Serial / USB mode  │
└──────────────────────┘
```
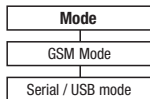
You can change between the two program communication modes in the *"Mode"* menu.

The *"Serial/USB mode"* is the program's standard mode. The program automatically switches to this mode every time the program is restarted. All previous LogControl DL program versions run in this mode. That means that communication between the application and pressure logger can only take place via the USB readout unit connected to the computer.

The second mode which the program is equipped with since Version 1.0.3.20 is the so-called *"GSM mode"*. This mode enables the program to communicate with the pressure logger via a modem that is connected to the computer. The modem must, however, first be configured as described in chapter 3.2.2.

The pressure logger which is to be read out also requires a GSM modem. This modem must be registered with the program and configured as described in chapter 3.2.4.

As soon as these two steps have been completed the GSM mode can be used to its full potential. This means that the program can be operated as before with the exception that communication now takes place between the modem and the pressure logger (see chapter 3.5.1).

There is a graphic display in the toolbar (chapter 3.5) which enables you to tell which mode the program is in more quickly. A yellow icon (fig. 3-15) at the right end of the toolbar appears when the program is in *"Serial/USB mode"*.

Figure 3-15: "Serial/USB mode" icon

If, however, the GSM mode has been selected, the graphic at the right end of the toolbar changes to a pink and red icon (see fig. 3-16).
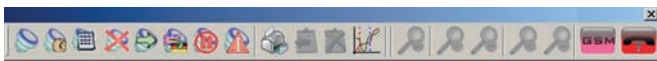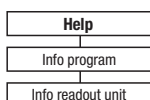

Figure 3-16: "GSM mode" icon

3.4 "Help" Menu

```
┌──────────────────────┐
│         Help         │
├──────────────────────┤
│     Info program     │
├──────────────────────┤
│   Info readout unit  │
└──────────────────────┘
```

3.4.1 Program Information

You will find detailed information on the program version of the installed program as well as details on how to contact Trotec in the *"Help"* menu under the menu item *"Info program"*.

3.4.2 Readout Unit Information

A further information window which can be called up using the menu item *"Help"* is the window which contains information on the readout unit. The information in this window is necessary for some program updates because some new features in the PC program may require that the readout unit and the pressure logger be updated.

When this function has been called up, a dialogue window containing information on the software and hardware status and the readout circuit board will open.

You will only receive this information if the readout circuit board is connected to the computer and the interface has been configured correctly in the program (see chapter 3.2.2) and a pressure logger is on the readout unit. If not an error message will appear.

An error can occur while the information is being read out if the readout circuit board has an older software version.

As explained above, you may have to update your logger components in order to be able to use all the functions in the LogControl DL program. The new functions for the logger (see chapters 3.5.3 and 3.5.4) require that your pressure logger is at least equipped with the software version 1.4 and the readout circuit board 1.3.

3.5 Toolbar

The following chapter describes the individual functions which are available in the toolbar.

The availability of the functions depends on the object which has currently been selected in the sector *"Pressure logger and measurements"* (see chapter 2.4.1). The functions *"Read out pressure logger"* and *"Overlap measuring curves"* are not context dependent and can be used at any given time.

3.5.1 Reading Out the Pressure Logger

Select this menu item when you wish to read out the pressure logger. In order to perform this function a pressure logger must either be connected to the program via a readout unit or a modem.

If you use a readout unit to read out the data, you must ensure that all drivers and the COM port are installed and configured as described in chapter 3.2.2.

When you click on the button in USB mode, the program starts to read out the pressure logger. There is also a status bar which shows you how far the readout has progressed (see chapter 2.3).

When the data has been read out, a pressure logger symbol will appear in the sector *"Pressure logger and measurements"*. If the pressure logger has saved any measurements, then you will also see symbols of measurements in this sector.

You also have to click on this button to read out the pressure loggers via a GSM modem. The telephone numbers and reception times of the modem have to be configured first (see chapter 3.2.4). An error message will appear if the telephone list is empty and the pressure logger cannot be called up.

The same error message will appear when you click on the button and none of the pressure logger modems are ready to receive. When all the settings have been performed correctly and at least one GSM modem is ready to receive, the connection will start to build up and the logger will be queried when you click on the button.

As in *"Serial/USB mode"*, the program's status bar enables you to see how far the connection has been built up and the status of the data readout. If more than one modem is ready to receive at any one time, then the program will build up a connection to one modem after another. This means that in effect all the ready-to-receive modems will be read out one after the other.

3.5.2 Setting the Pressure Logger Time

As is the case with the function *"Read out pressure logger"*, this function requires that a pressure logger is connected to the computer either via a readout unit or a GSM connection (see chapter 4.1).

When these requirements have been met, a new window in which you can enter the time and date of the pressure logger (see fig. 3-17) will appear as soon as you click on *"Set pressure logger time"*.

Click on *"Save"* to transfer the settings which you have selected to the pressure logger. Click on *"Cancel"* if you wish to terminate the procedure without saving the settings you have previously selected.
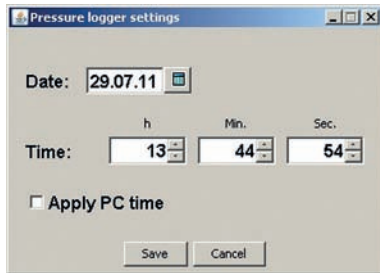
Figure 3-17: "Pressure logger settings" window

3.5.3 Resetting the Pressure Logger

This function can be used to delete all the measurements that have been saved into the pressure logger. This applies to all measurements that have been completed.

Measurements which still have to be carried out or measurements which are currently being performed (see chapter 3.5.5) will remain in the memory of the pressure logger. These have to be deleted explicitly using the pressure logger's keypad if this is intended.

In addition, all requirements as listed in item 3.5.1 must be met in order to be able to use this function.

3.5.4 Pressure Logger Real-time Read Out

A further new function that is available from the program version 1.0.1.5 onwards is the function *"Real-time read out"* This function enables you to follow a measurement that is being currently carried out with the pressure logger program, i.e. the pressure logger can be used much like a pressure recorder.

This function is normally used when the pressure logger is integrated in the pipe system that is being monitored, i.e. the pressure logger is a fixed part of the installation.

In such a case you must remember that communication between the computer and the logger cannot be effected immediately as the pressure logger is equipped with a tilt sensor which prevents communication when it is an integral part of an installation. The reason is to conserve battery power.

It is, however, possible to put the pressure logger in communication mode when it is an integral part of an installation by pressing one of the pressure logger's keys. As soon as one of the keys has been pressed, information on the measurement which is currently being carried out will appear on the pressure logger's display. Communication between the computer and the logger can now be established.

Place the readout circuit board that is connected to the computer over the logger display and read out the logger as described in chapter 3.5.1.

After a short synchronisation pause between the computer and the logger, the pressure logger will appear as a symbol in the sector *"Pressure logger and measurements"* (see chapter 4.1). Select this symbol and call up the function *"Real-time readout"* from the menu bar. The measuring values of the current measurement will then appear in the sector *"Measuring curve"* (see chapter 4.2) in accordance with the interval times.

The pressure logger does not have to be connected to the modem manually in GSM mode, as they are then already connected permanently. You must only ensure that a connection between the logger and the GSM modem is set up as described in chapters 3.5.1 or 4.1 Then select a pressure logger symbol in the sector *"Pressure logger and measurements"* and perform the real-time readout by clicking on the button.

3.5.5 Programming Measurements

You can use this function to program the pressure logger.

That means that you can either program 5 time controlled measurements (TCM) or 1 single operation controlled measurement (OCM), which you can then read out with the LogControl DL program.

Each type of measurement is fundamentally different to the other.

When you carry out a time controlled measurement (TCM), you enter the duration of the measurement along with the starting time. That means that the measurement has a defined starting time which you yourself select and a defined end, which depends on the interval time and the number of measuring values.

When you carry out an operation controlled measurement (OCM), the measurement starts when either the upper or the lower pressure threshold is exceeded. When one of these thresholds, which have been previously predefined by you, is exceeded, then the pressure logger measures 5,500 measurement values per triggered measurement.

It is important to remember that the pressure logger is equipped with a ring memory which allows the logger to save up to 240,000 measuring values. This means that any measurements which were carried out before the last 240,000 measuring values are saved are overwritten and therefore deleted.

The measurements which have currently been saved and the resulting measuring values are shown in the window *"Program measurement"* (fig. 3-18) below the table in which the measurements which are to be programmed can be seen. Furthermore, it is necessary that the pressure logger and the readout circuit board are connected to the computer during the whole measuring program or connected to a GSM modem when a GSM connection has been established.

Determining Measuring Parameters

In the left half of the *"Program measurement"* window there is a calendar which shows the current month. You can determine the starting day of a measurement by selecting a specific date in the calendar. Mouseover the date you wish to select and left click.
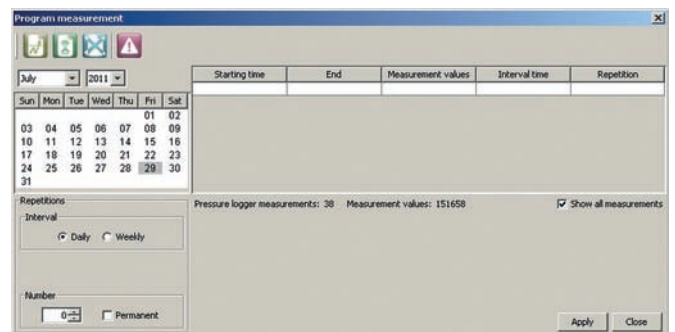

Figure 3-18: "Program measurement" window

When a date has been selected, click on [ ] to open the window shown in fig. 3-19 and set the parameters for a TCM (time controlled measurement).

Click on [ ] to open the window shown in fig. 3-20 to program the OCM (operation controlled measurement).

Please note that the two measurement methods cannot be mixed, i.e. you can either program 1 OCM or a maximum of 5 TCMs. The next two sections will show you how the measuring parameters are determined.

Setting the parameters for a TCM (time controlled measurement) [ ]

In the top half of the *"TCM measurement parameters"* window (fig. 3-19) you will see the date on which the measurement is to be carried out. You can change the starting time by entering a value into the text box *"Starting time"*. In order to do click on either the hour, minute or second value and then on the arrow keys to the left of the box to change the starting time.

Proceed in the same manner to change the parameters for the boxes *"End time"* and *"Interval time"*.

You can change both the time and the date in the *"End time"* box. The value that has been selected in the *"Interval time"* box shows the time between two measurements. That means the bigger the value, the fewer the number of measuring values for a measuring period.

Click on *"Apply"* to accept the measuring values or on *"Close"* if you wish to terminate the procedure.

When you have clicked on *"Apply"* the measurement will be shown in the table in the main window "Program measurement" (fig. 3-18) and the day on which the measurement is to be carried out will be highlighted in blue in the calendar.

Figure 3-19: "TCM measuring parameters"

Setting the parameters for an OCM (operation controlled measurement)

You can use the window shown in fig. 3-20 to set the OCM parameters. In the upper part of the window you will see the date on which pressure monitoring is to start. You can either change the starting time or the time you would like monitoring to end in the lower part of the window.

You can either enter a value directly into the box or change the values by pressing the arrow keys to the right of the boxes. Proceed in a similar manner to change the boxes *"Maximum"*, *"Minimum"*, *"Memory interval"* and *"Measurements"*.

The monitoring interval box has predefined values. You can see these values by clicking on the triangle to the right of the box. You can select your individual value from the list.

Please remember that you can only determine when the pressure monitoring process starts but not the start of the measurement itself. This is achieved for OCMs by determining the pressure thresholds in the *"Minimum"* and *"Maximum"* boxes. The values are formatted in mbar so that 1.5 bar has to be entered as 1,500 mbar. The monitoring interval is displayed in seconds and determines after how many seconds a measurement is carried out and subsequently saved.

Figure 3-20: OCM measuring parameters window

Because the number of values is limited to 5,500 values per measuring operation, the data can be logged for a maximum of 15 hours and 15 minutes from the point the operation begins when you leave the memory interval on 1.

By increasing the memory interval you can instruct the logger to save every nth value during the measurement, thereby increasing the length of the measuring period. This allows you to save a maximum of every tenth value. If you set the monitoring interval to 10 seconds, then this means that 100 seconds elapse before any two measuring values are saved.

It is also possible to form an average of the values which are not saved and to save this average value as a measuring value. Click on *"Yes"* in the *"Take average values"* sector to activate the calculation.

In the *"Measurements"* sector you can determine the number of measurements that you would like to be saved. You can select between 1 and 40 measurements. Because the logger can manage a maximum of 40 measurements, it overwrites the oldest measurement when you carry out non-stop operation controlled measurements.

Deleting Measurements

If you do not wish to send a particular measurement to the pressure logger, you can delete the measurement in question from the table. Only the measurements shown in the table are sent to the logger when you click on *"Apply"* (fig. 3-18).

To delete a measurement from the table mark the measurement you wish to delete by clicking on the line that contains the measurement and then click on *"Delete"*.

If you click on *"Apply"* when there are no measurements in the table, then all the measurements which are waiting to be started in the pressure logger will be deleted. By proceeding as described above it is therefore possible to delete a measurement parameter list that has been programmed incorrectly.

Programming Measurements

Click on *"Apply"* (fig. 3-18) to start programming a measurement.

The pressure logger can only be programmed when at least one or a maximum of five time controlled measurements are in the table in the window. In the latter case the *"Add"* button appears in grey and cannot be selected. You can only add another measurement to the table when one of the existing measurements has been deleted (see "Determining measuring parameters").

The same thing happens to the button when you have programmed an operation controlled measurement via the *"Add OCM"* button. In addition, contrary to time controlled measurements, only one OCM can be added to the parameter list.

When all the conditions have been met, the measurements are transferred to the logger when you click on *"Apply"*. If all the measurements have been transferred correctly, you can see when the next measurement is programmed to start on the pressure logger's display.

"Repetitions" sector

In the *"Repetitions"* sector (fig. 3-18) you can define when another TCM is to take place.

You must carry out the setting *"daily"* or *"weekly"* before the first measurement takes place. If a measurement has already been entered into the table, then this setting can no longer be changed. The number of repetitions can, however, be determined before individual measuring parameters are set.

By selecting daily you are determining that a measurement be carried out every day at a specific time. You can enter the number of repetitions in the *"Number"* box, which means that if you enter zero, then the measurement will only be carried out on the predefined date.

If, on the other hand, you have programmed four repetitions, then the measurement is carried out for a total of five days. The same rule applies when weekly is selected instead of daily. In this case the repetitions are carried out weekly and not daily.

Attention: If a measurement has been programmed and a repetition has been defined for this measurement, then a further measurement cannot be programmed to take place at the time the measurement is to be repeated. It is not possible for two measurements to be carried out at the same time.

Setting Alarm Parameters ⚠️

The pressure logger is equipped with a feature which is designed especially for use in GSM mode. It can generate an alarm when minimum and maximum pressure thresholds are exceeded irrespective of the type of measurement which has been selected (OCM or TCM).

When the pressure logger is combined with a GSM modem, then an alarm can be sent to a mobile (see chapter 3.2.4) when the pressure thresholds have been exceeded.
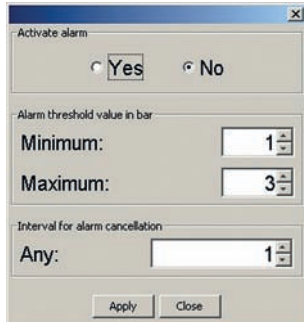

Figure 3-21: Alarm parameters dialogue

To activate the alarm click on *"Set alarm parameters"* (see fig. 3-18).

When you click on the button, the dialogue as shown in fig. 3-21 appears. You can use this dialogue to set the pressure thresholds and to activate or deactivate the alarm.

The interval limit for the alarm cancellation also determines how many measuring points are collected after the pressure has returned to within the pressure thresholds so that the alarm can be reset.

When you click on *"Apply"* the data is saved temporarily, but not transferred to the logger. The alarm parameters are written into the pressure logger when the measuring parameter list has been transferred to the pressure logger (see "Programming measurements").

When you click on *"Close"*, then no alarm parameters are transferred to the pressure logger.

3.5.6 Changing the Logger Language 🌐

The language setting is another one of the toolbar's context relevant functions on the toolbar. This function enables you to change the logger's display language and to use your own language provided the logger supports this particular language.

The logger's language settings can only be changed via the program and not at the device itself.

With the company software 2.1 the device supports the languages German, English, French, Slovenian and Italian. In order to be able to use this function to its full potential the conditions as described in chapter 3.5.1 must also be met.

3.5.7 Stopping the Current Measurement 🛑

If a measuring parameter list determining which measurements are to be carried out has been saved in the pressure logger (see chapter 3.5.5), you can use this function to delete the programmed list.

In this case all the measurements in the parameter list which are waiting to be carried out will be deleted.

In addition the measurement which is currently being carried out will be stopped and saved into the pressure logger's memory. Because the measurement has been terminated prematurely not all the measurements which have been programmed will be collected.

3.5.8 Resetting the Alarm Counter ⚠️

The alarm counter described in the section *"Setting the alarm parameters"* registers the number of times an alarm is triggered, i.e. the number of times the upper or lower pressure threshold is exceeded.

This function enables you to delete the alarms that have been saved and to reset the alarm counter to zero.

3.5.9 Printing Selected Measurements 🖨️

As was the case with the previous function, this function is also context dependent and provides you with a different result depending on the selected object in the sector *"Pressure logger and measurements"* (see chapter 2.4.1).

When a pressure logger has been selected, this print function can be used to print out information on the logger.

If, on the other hand, a measurement has been selected, the program will print out the graphic shown in the sector *"Measuring curve"* along with any additional information that has previously been entered in the dialogue box *"Additional information"* (see chapter 4.2.3).

When you have clicked on *"Print selected measurement"*, a dialogue window will appear with a preview of the document you wish to print out.

There are a number of functions available in the toolbar (fig. 3-22) with which you can edit the document if necessary.

Figure 3-22: Print dialogue toolbar

You can use the magnifying glass symbols *"+"* and *"–"* to enlarge or reduce the size of the preview of the document you wish to print out.

You can use the *"<"* and *">"* symbols to reach another page if the document consists of more than one page.

Click on the printer symbol that has a tick mark to reach the dialogue window in which you can determine the size of sheet and the format (portrait or landscape) you would like to select.

Click on the first print out symbol in the toolbar to print out the document.

3.5.10 Excel Export 📊

You can use this button to export the measurement values into a CSV file. CSV (Comma Separated Values) is a way of depicting data using semi-colons to separate the individual measuring values from one another and saving it in a file that can then be edited using Excel.

When you click on *"Export a selected measurement"*, a window will appear in which you can enter the memory place as well as the file name for the Excel file.

Click on *"Save"* to finish exporting the file. This button is always available in single image view (see chapter 4.2.1). When you use the overlapping view, you have to define the sector that is to be exported in first. See section 4.2.2 to find out more about exporting in overlapping view.

3.5.11 Deleting Measurements ❌

You can use this function to delete a measurement which you no longer need.

To delete a measurement first mark the measurement by left clicking on it. Then click on *"Delete selected measurement"* to delete the measurement from the database.

3.5.12 Overlapping measuring curves

Click on this button to overlap measuring curves. This function enables you to present measuring curves with different starting times in one diagram and to put individual measuring points on the same position.

When you click on *"Overlap measuring curves"*, a new window opens.
You can select which measuring curves you would like to overlap in this window (fig. 3-23).

You can select which measuring curves you would like to depict in the diagram by clicking in the first column and placing a tick there. Then click on *"Apply"* to show your selection in the *"Measuring curve"* sector.

If there are too many measurements in the *"Select a measuring curve"* window, then you can sort out which measurement you would like to keep and which you would like to discard by clicking on the head of the table. Depending on how you click the table will be sorted according to the time the measurement was started, the interval time or the name of the measurement.

See chapter 4.2.2 for more information on further functions which this display mode has to offer.

The program version 1.0.3.20 only allows you to overlap TCMs. This is why you are not able to select an OCM in the dialogue shown in fig. 3-23.
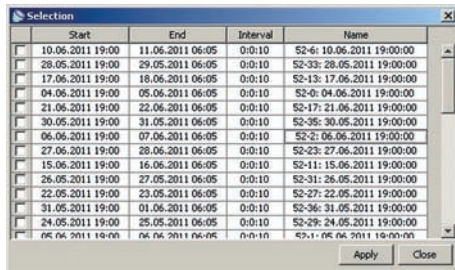

Figure 3-23: "Select a measuring curve" window

3.5.13 Zoom Autoadjust

If you have changed the zoom in the diagram in the *"Measuring curve"* sector, you can use this function to reset the zoom to its initial status. The measuring curve will then be displayed in the diagram with all the measurement values.

This function is only available when a measurement has been previously selected in the *"Pressure logger and measurements"* sectors.

3.5.14 Zooming In

The zoom in function enables you to enlarge the diagram in order to be able to view a section of the diagram in more detail.

Because the diagram has a horizontal and a vertical axis, there are two symbols, one for each axis. That means that you can enlarge the vertical axis, i.e. the axis on which the pressure is displayed, by clicking on the first zoom-in symbol and the horizontal axis, i.e. the axis on which the time is displayed, by clicking on the second zoom-in symbol.

3.5.15 Zooming Out

Just as it is possible to zoom in on a diagram it is also possible to zoom out again in order to gain a better overall view. You can also zoom out of both axes, separately. The first zoom-out symbol can be used to reduce the size of the vertical axis and the second zoom-out symbol to reduce the size of the horizontal axis.

3.5.16 USB Mode

As described in chapter 3.3, the program can be used in two different modes. One of the modes is the *"Serial/USB mode"*, which allows you to read out the pressure logger via the readout unit connected to the computer.

The button shows you which communication mode the program is currently in. You can either switch between the two modes by following the steps described in chapter 3.3 or by clicking on this button.

3.5.17 GSM Mode

The second communication mode is *"GSM mode"*. When the program is in this mode, communication between the program and the pressure logger is effected via a GSM connection.

This button also shows you which mode the program is currently in. In much the same manner as described above, you can also change the mode directly by clicking on the button.

3.5.18 Disconnecting

If an error occurs while a connection is being built up to a pressure logger or during the time the logger is connected, you can use this function to either disconnect the logger or to terminate the dial up.

When you click on the button, it takes a few seconds for the program to disconnect the connection and make the communication port available again.

This function can also be used to build up a connection to a different logger. Although the program is able identify that a connection already exists and also able to disconnect this connection automatically, you can disconnect the connection manually by clicking on this button.

4. Sector Functions

The following chapter is designed to provide you with an overview of the program's window functions.

4.1 "Pressure Logger and Measurements" Sector

This sector of the program shows the pressure loggers and measurements which have been saved into the readout circuit board (fig. 4-1).

Measurements which already exist in the database are listed automatically under the pressure logger circuit board icon when the program starts and receive a green icon that symbolises a paper document.

The pressure loggers which have been read out are listed after the measurements which have already been saved and receive a blue icon which is meant to symbolise a pressure logger. If there are any new measurements which have not yet been saved into the database in the pressure logger, then these are read out automatically by the program and placed below the logger icon in the display.
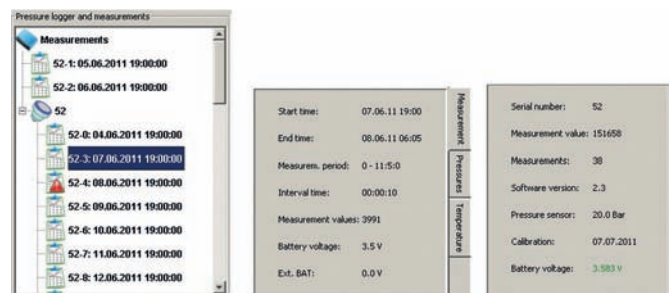

Figure 4-1: "Pressure logger and measurements" sector

If an error occurs while the data is being read out, the program generates an error message which appears on the display. Such errors can occur when measurements are being read out.

Measurements whose data sets have not been read out completely are also labelled with an icon which is shown on the display. This icon comprises a red triangle with a white exclamation mark.

By selecting the same measurement again you can instruct the program to repeat the procedure and read out the measurement.

Attention: Measurements whose icon contains a red triangle with a white exclamation mark are not saved into the database by the program. This means that these measurements will not be shown when the program is restarted.

When the program has started and neither a pressure logger nor a measurement has been selected, the only buttons available in the toolbar (see chapter 3.5) are *"Read out pressure logger"* and *"Overlap measuring curves"*.

In this program state you can either read out the pressure loggers which are in the readout circuit board (see chapter 3.5.1) or overlap measurements which are already in the database. You must mark either a measurement or a pressure logger in order to be able to use the other functions in the toolbar.

When you have marked a measurement by left clicking on the measurement, you can use the functions *"Print selected measurement"* (see chapter 3.5.9), *"Excel export"* (see chapter 3.5.10) or *"Delete measurement"* (see chapter 3.5.11).

When you have marked a pressure logger, use the functions *"Set pressure logger time"* (see chapter 3.5.2) and *"Program measurement"* (see chapter 3.5.5). The functions *"Reset pressure logger"* (see chapter 3.5.3), *"Real-time readout"* (see chapter 3.5.4) and "Change language" (see chapter 3.5.6) are also available.

The functions *"Read out pressure logger"* and *"Overlap measuring curves"* are context independent and can be used irrespective of the objects which have been selected and are shown on the display.

In addition, more detailed information appears under the window *"Pressure logger and measurements"* (fig. 4-1, right) when a measurement or a pressure logger has been selected. The information shown there depends on the selected object (see section 2.4.1).

When you are in GSM mode (see chapter 3.3) and you select a pressure logger, the program checks if there is already a GSM connection to the pressure logger you have selected and the program.

If the pressure logger is not connected to the program, the program will ask you whether a connection should be set up or not. You can answer with either *"Yes"* or *"No"*. If you click on *"Yes"*, the program will automatically set up a connection to the pressure logger. The relevant buttons in the toolbar (see chapter 3.5) are now activated and can be used.

If a GSM connection to a selected logger already exists, the program will ask you if this connection should be disconnected before it sets up a connection to another pressure logger.

4.2 Measuring Curve Sector

The values of the pressure loggers which were selected in the *"Pressure logger and measurements"* sector are displayed as a diagram (see fig 2-5) in the *"Measuring curve"* sector.

If a pressure logger has been selected in the *"Pressure logger and measurements"* sector, then nothing will be displayed in this part of the program

The measuring values are displayed as a line diagram. The y-axis represents the pressure values and the x-axis represents the time. The time on the x-axis is shown in hours, minutes and seconds (hh:mm:ss) for a measuring curve.

If several measuring curves are to overlap, the units can also be in months and years, depending on how far apart the starting times of the individual measurements are.

In addition, this sector also enables you to gain detailed information on a measuring value by placing the cursor on the measuring value and allowing it to remain there for a few moments.

The program will now show you the so-called *"Tool tip"*. The *"Tool tip"* shows you the date and the exact value of the measuring point.

The diagram has a pop-up menu which appears when you right click into the diagram.

You can use this menu to change the scale of the vertical axis and to transform the pressure values into height values. The scale then also changes from mbar to metres.

Further functions which the program provides you with can be accessed via the respective *"Divide"*, *"Calculate"*, *"Overlap"* or *"Mark"* buttons. See chapter 4.2.1 to find out more about the first two functions as these two functions are only available in this particular view. See chapter 4.2.2. to find out more about the latter two functions.

4.2.1 Single View Image

There are a number of further functions available in this sector which can be used by pressing the buttons as shown in figure 2-5. If you are in single view image, i.e. the measuring curve is depicted in this sector as a single diagram, then press either *"Divide"* or *"Calculate"* to divide up the measuring curve or calculate the pressure difference between the maximum and minimum pressure value of a measurement.

Dividing

The *"Divide"* button enables you to extract certain parts of the measuring curve. You can extract either one part or more than one part.

After you have clicked on *"Divide"*, mouseover the line diagram. A vertical blue dotted line which follows every horizontal movement your mouse makes is now drawn into the diagram.

This line determines which section is to be extracted, i.e. defines the starting point and the finishing point of the sector you wish to extract.

When you left click into the diagram and move your mouse to the left, the program draws a yellow area into the diagram. Move the mouse to change the size of the area.

Click into the diagram again to complete drawing in the sector you wish to extract. Now only the blue line will follow the movements you make with your mouse.

This procedure can be repeated depending on the number of measuring curves you would like to extract out of a single measuring curve.
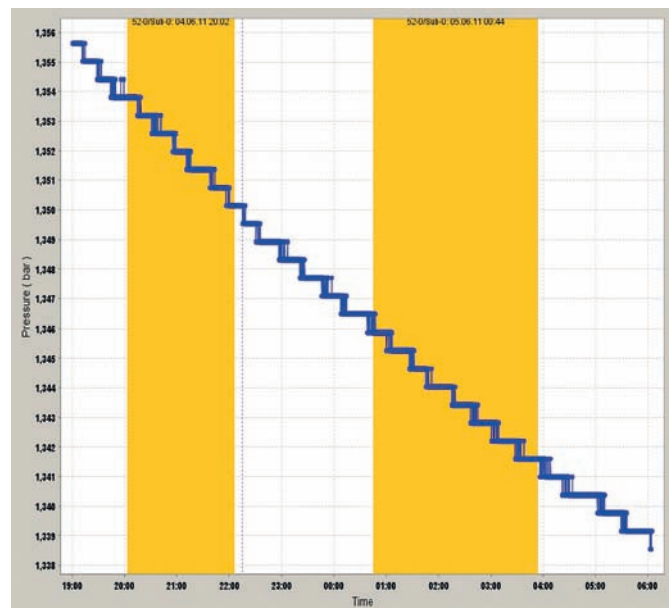

Figure 4-2: Dividing up a measuring curve

When all the sectors that you would like to extract have been marked, click on the button again to complete the procedure. The marked sectors are then removed from the diagram and the new measurements are added to the *"Pressure logger and measurements"* sector.

Calculating

This function can be used to calculate pressure differences in a measuring curve. First draw two marked areas into the diagram.

A red area, which represents the marked area for the high pressure, and a green marked area, which represents the low pressure area.

All the measuring values which are within a marked area are drawn upon by the function designed to calculate the pressure difference. The pressure difference is calculated using the mean values of the measuring values which are within the marked area.

Figure 4-3 shows the two marked areas. Following this the calculated values are shown in the *"Pressure logger and measurements"* sector (see fig. 2-4).

Click on *"Calculate"* to start the calculation and mouseover the line diagram. A vertical blue dotted line which follows every horizontal movement your mouse makes is now drawn into the diagram.

This line determines the boundaries of both your marked areas, i.e. defines the starting point and the finishing point of the marked area.
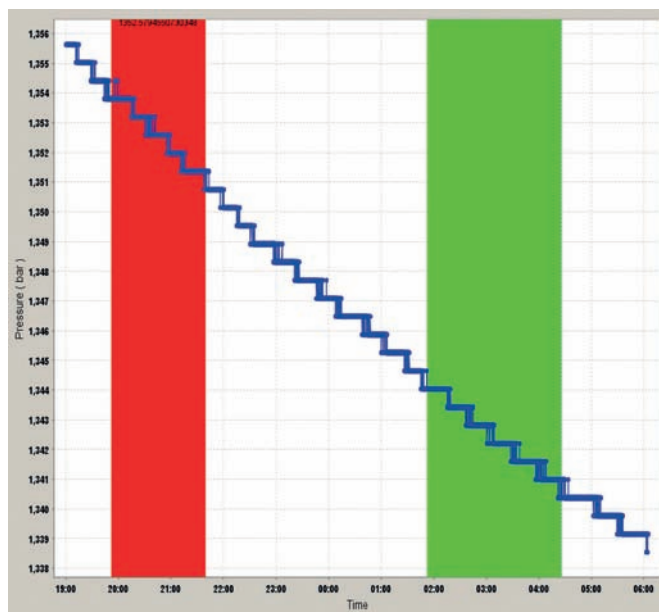

Figure 4-3: Calculating the pressure difference

When you left click into the diagram and move the mouse left, the program first draws a red area into the diagram. Move the cursor to increase or reduce the size of the diagram.

Click into the diagram again to complete drawing in the red area. The measuring values that are needed to calculate the high pressure values are now marked. The blue line now follows any horizontal movements which you make with your mouse. Then draw the green area which calculates the mean value for the low pressure into the diagram. Proceed as you did when drawing in the red area.

When you draw in the end of the marked area, i.e. when you click into the diagram for the second time to close the marked area, the function automatically removes the drawn in areas and shows the calculated values (see figure 2-4).

4.2.2 Overlapping View

When the view that is shown displays more than one measuring curve, you can overlap several measuring curves or select data sectors which can then be exported to Excel by clicking on *"Overlap"* or *"Mark"* respectively. The following sections describe how to use these functions.

Overlapping

When you select the display mode with more than one measuring series (chapter 3.5.12), you can select the function that enables you to overlap measuring curves. This function can be used to overlap any number of measuring points from measuring series, i.e. the measuring points (one per series) which are to overlap can be selected at random from a measuring series.

Left click to mark the measuring points you would like to overlap. A vertical red line which crosses the marked point is now drawn into the diagram.

Proceed in the same way to mark further measuring series. Left click into an empty part of the diagram to delete any markings you may have carried out (see fig. 4-4).

The markings you have set are then deleted and you may start again.

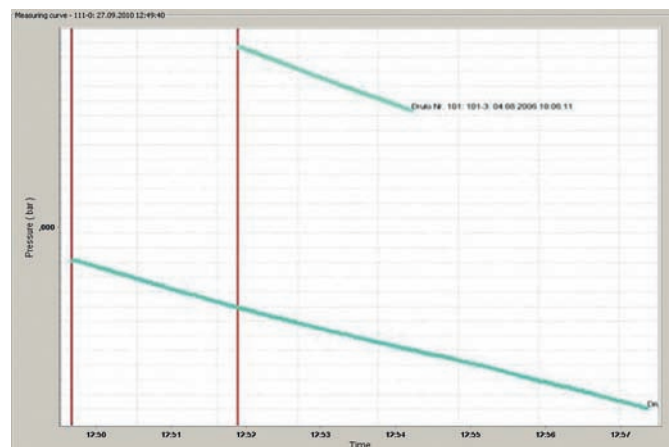Click on *"Overlap"* to overlap the measuring curves when all the markings have been set.

Figure 4-4: Overlapping measuring curves

Marking

You can also export measuring values in overlapping mode. You can only export the measuring values which have been marked previously in this mode.

The function *"Export selected measurement"* is not available as standard in this view (fig. 3.5.10). It becomes available when the measuring values have been marked accordingly.
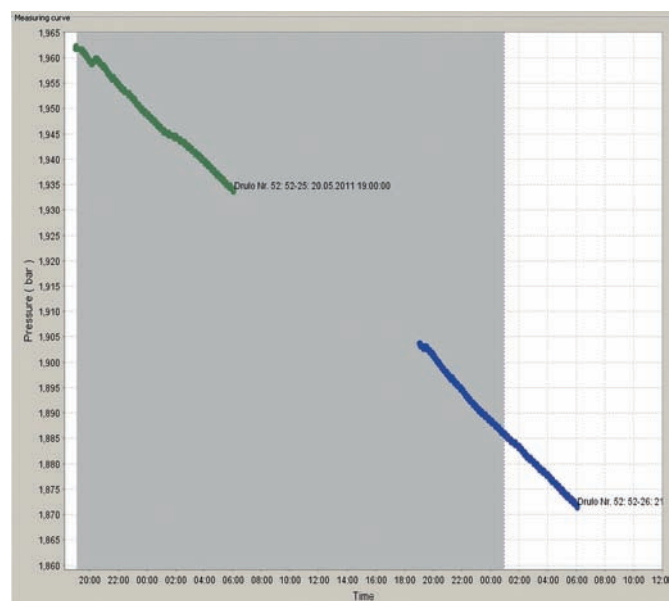

Figure 4-5: Marking the export sector

Click on *"Mark"* to activate the function. A vertical blue dotted line which follows every horizontal movement which your mouse makes is now drawn into the diagram. This line determines the boundaries of the marked area, i.e. defines the starting point and the finishing point of the marked area.

Left click into the diagram and move the mouse to the left. The program draws a grey area into the diagram. Move the mouse to change the size of the area. Click into the diagram again to finish drawing in the marked area (see fig. 4-5).

The function *"Export selected measurement"* is now available. Proceed as described in chapter 3.5.10 to export the marked area.

When you have finished exporting the data, end the marking function by clicking on *"Mark"* again. The marked area is removed from the diagram and the function *"Export selected measurement"* is no longer available.

4.2.3 Additional Information on Windows

In single image view you can add additional information to a diagram in the database. This additional information is also printed along with the diagram when the diagram is printed out.

If no information has been added, then the relevant boxes in the measuring protocol remain empty. You are then free to end additonal information by hand when the protocol has been printed out.

To add information to a measurement, select the measurement in the *"Pressure logger and measurements"* sector so that the measuring curve can be shown in the *"Measuring curve"* sector.

Then double click into the diagram to open the *"Additional information"* window. Now you can add the information to the window.

Complete on *"Apply"* to complete the procedure. The information is now saved into the database.

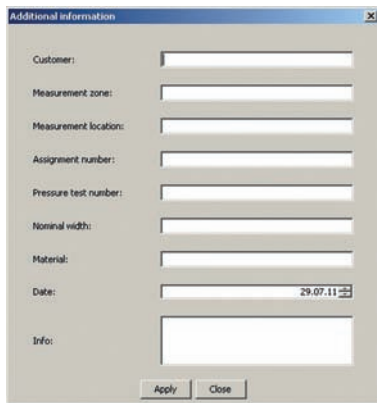Click on *"Close"* to reject your entry and terminate the procedure.

Figure 4-6: Additional information window

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