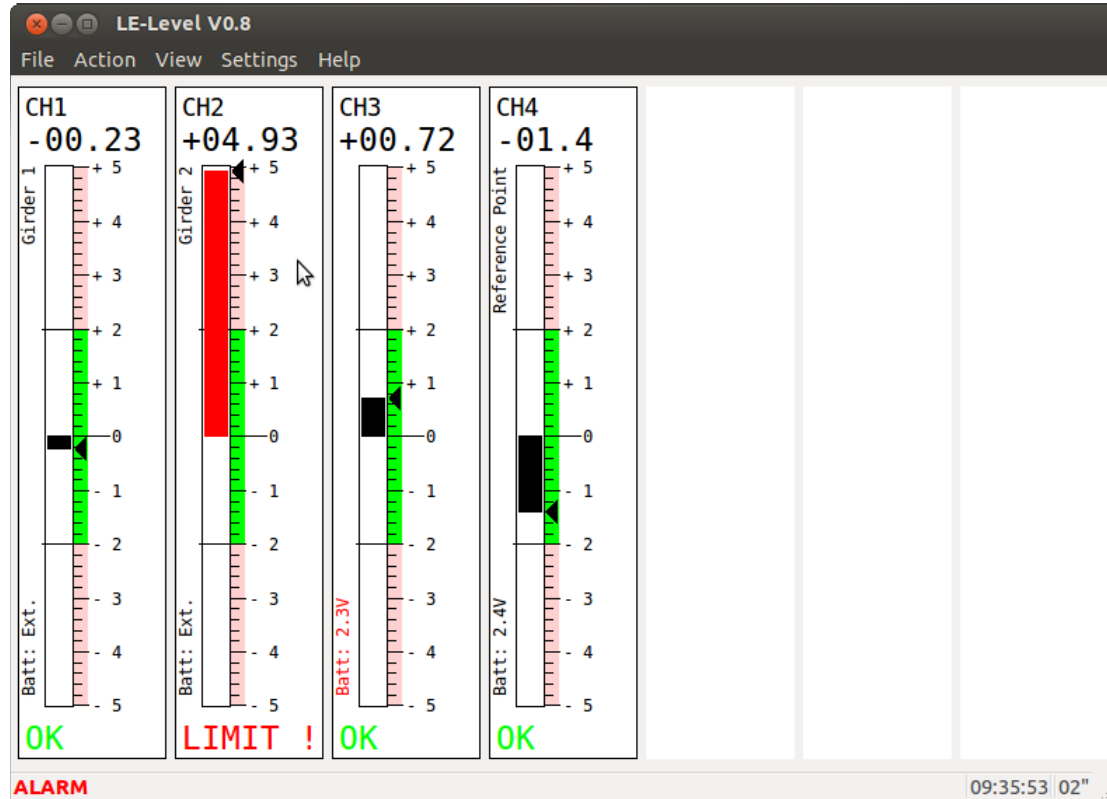


# User Manual for

## *LE-Level V0.8*

(C) GEO-Feinmechanik GmbH  
Release date 26.07.2012

### Surveying Software for *LE-71* and *LE-72* Precision Laser Receivers



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## Introduction

The program *LE-Level* can be used with up to seven precision laser receivers of the type GEO *LE-71* and *LE-72* to monitor all types of position changes. The current position data are shown as bar graph or in the form of a diagram, logged and monitored. An alarm function can be triggered when limit values are broken or other errors occur.

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## System Requirements

*LE-Level* was developed for the *Linux* operating system (*Ubuntu 12.04*). It runs on all hardware supported by this version of *Linux* and which fulfills the following additional requirements:

- Screen resolution at least 1024 x 600 pixels
- Processor clock rate at least 1 GHz

- 256 MB RAM
- 25 MB free hard disk space
- Linux *Ubuntu 12.04* operating system installed
- Internal or external Bluetooth adapter supported by Linux  
*Note:* Please remember that the maximum range and number of simultaneous connections depend on the Bluetooth adapter used. For optimal operation, please use a class 1 adapter, which supports up to seven simultaneous connections.
- The laser receivers *LE-71* or *LE-72* must have a firmware version V0.44 or higher.  
 To update the firmware, please contact *GEO-Feinmechanik GmbH*.
- The matching licence key must be installed for every laser receiver used.

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## Quick Start

### Installation of LE-Level

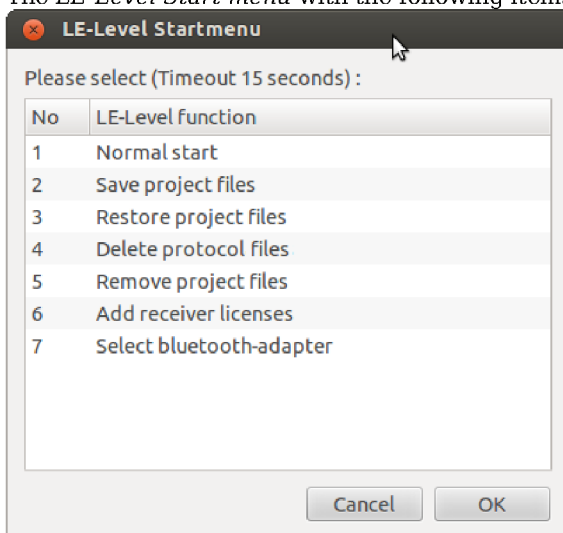
Please read the file *LE-Level\_Installation\_EN.pdf* on your installation medium.

### Getting the laser and receivers ready

- Set up the laser and switch on.  
 Pay attention to the safety instructions in the manuals.
- Set up the laser receivers of the type *LE-71* (1/100 mm resolution) or *LE-72* (1/10 mm resolution) at the required measuring points. Please make a note of the respective type of receiver and its serial number for every measuring point. *Note:* If you want to monitor the measured data over a longer period of time, we recommend you use an external 12 V DC power source instead of the built-in rechargeable batteries.
- Switch on the receivers in the mode *Cont. meas.+BT-Radio*.
- Please make sure that the laser beam is being received perfectly by the laser receiver.
- Select the starting height appropriately for the expected movements in the measuring points. In the normal case, therefore, the height of the laser beam should lie in the area of the marking notch in the middle of the reception area.

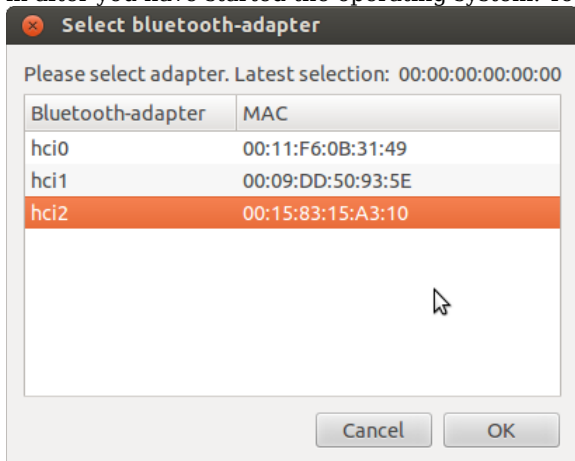
### Launching LE-Level

- Boot your computer and log in at the login window. Please use "GNOME Classic (No Effects)" as standard desktop when logging in.
- There is a starter icon named *LE-Level* on the desktop. Launch the program by double-clicking it with the mouse.
- The *LE-Level Start menu* with the following items is shown:



- *Normal start:*  
 The main *LE-Level* program is started. This item is run automatically after 15 seconds when starting for the first time.
- *Save project files:*  
 This function can be used to save the data of the active measurement project as *ZIP* file. The backup file can then be found in the subdirectory *LE-Level-Backups* in your home directory.
- *Restore project files:*  
 This function can be used to restore backups of projects.
- *Delete protocol files:*  
 Deletes the protocol file (but not the *DBF* file, if it exists) of the current project.
- *Remove project files:*  
 Deletes the active project. *LE-Level* is then back in delivery state. The licence data remain unchanged. They can only be deleted manually. *Caution:* The complete data folder is deleted. Files from other programs in it are also deleted.

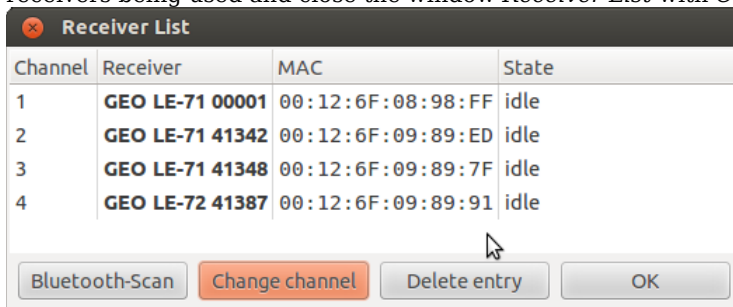
- *Add receiver licenses:*  
This function is used to add new receiver licences to the current licence file.
- *Select bluetooth-adapter:*  
Selection of the Bluetooth adapter used by LE-Level.
- If your computer has more than one Bluetooth adapter connected to it, please select *Select bluetooth-adapter* in the Start menu and select the required adapter. If you do not know the details of your adapter, please only plug it in after you have started the operating system. Your adapter is then shown at the bottom of the list.



- To start a new measurement project, activate the item *Remove project files* and confirm with *OK*.
- Then activate the item *Normal start* and confirm with *OK*.
- The main window of *LE-Level* then appears. If the question *Run autoconnect ?* appears, please cancel with *No*.

## Basic configuration

- In the menu *Setting->Unit* set the required dimensional unit and confirm with *OK*.
- Open the Receiver List with the menu *Setting->Receiver* and start the Bluetooth scan. A message window is opened, and closed again automatically when the Bluetooth scan is finished. Your laser receiver should now be shown in the *Receiver List* with the status *idle*.
- If *no license* is shown as status, the file with the licence keys might have been deleted or a licence has not yet been installed for the receiver concerned.  
Please exit *LE-Level* and install your licence data as described in the chapter *Licence Keys*.
- Select a receiver in the *Receiver List* and assign it the required receiver channel (1 to 7). Repeat this step for all receivers being used and close the window *Receiver List* with *OK*.



- Open the *Channel List* with the item *Setting->Channels* and select an entry of a channel being used. The channel numbers of channels that are being used are shown in bold type.
- Click *Scale* and set the minimum and maximum value to 0 in the dialogue window *Channel Bargraph Scale Settings* and close the dialogue with *Copy to all channels*. This means that the scale of the bar graph covers the complete measurement range of the respective receiver.
- Close the list of channels with *OK*. A bar graph appears in the main window for every channel being used.
- Start the Bluetooth connection process to the receivers with the menu item *Action->Start*. Depending on the distance and number of channels, this can take up to a minute.
- If the connections are good, the measured values are then shown for all channels being used. The position is shown in the upper part as numerical value and indicated in the scale by a small arrow. The receiver state is shown in the lower part.
- Check whether all channels have the status *OK*. If the text *Laser ?* is shown as position, the receiver is not receiving the laser.  
You can start a laser beam scan with the menu item *Action->Beam Search*.
- Open the *Channel List* again via *Setting->Channels* and select an entry of a channel being used.
- Then click *Zero offset* to open the channel zero offset setting. Click *Auto-Zero all Channels* to define the current measuring position as new zero point.
- In the *Channel List* click *Scale* to open the bar graph scale setting. Enter appropriate values as expected minimum and maximum measured value and click *Copy to all channels*.
- If you want limit values to be monitored, you can open the dialogue *Channel Limit Settings* by clicking on *Limits* in the *Channel List*. In this dialogue you can set the minimum and maximum limit value. Click *Copy to all channels* to close the dialogue. In the scale for the bar graph the range within these limit values is coloured green and outside

them light red.

- A short descriptive text can be entered for every channel. It is shown at the top left edge of the bar graph. To enter the text, click "Label" in the *Channel List*, enter the text in the dialogue window and confirm with *OK*.

Channel	Label	Zero Offset	Limit Min.	Limit Max.	Bargraph Scale Min	Bargraph Scale Max
1	Girder 1	+09.80	-02.00	+02.00	-05.00	+05.00
2	Girder 2	+10.00	-02.00	+02.00	-05.00	+05.00
3		+09.00	-02.00	+02.00	-05.00	+05.00
4	Reference Point	-08.30	-02.00	+02.00	-05.00	+05.00
5		+00.00	-02.00	+02.00	-05.00	+05.00
6		+00.00	-02.00	+02.00	-05.00	+05.00
7		+00.00	-02.00	+02.00	-05.00	+05.00

## Protocol setting

- The measured data can be saved in a protocol file. For automatic protocolling at fixed intervals of time, enter the required protocol interval in the menu *Setting->Protocol* in minutes or seconds and set the protocol mode to *Interval*. For manual protocolling, set the mode to *Manual*. Values can then be saved in the protocol via the spacebar or the *store* button.
- In order to be able to process the protocol data further in a spreadsheet program, you need to convert them to a *DBF* file with the function *File->Export*. The data are to be found in the subdirectory *LE-Level* of your home directory.

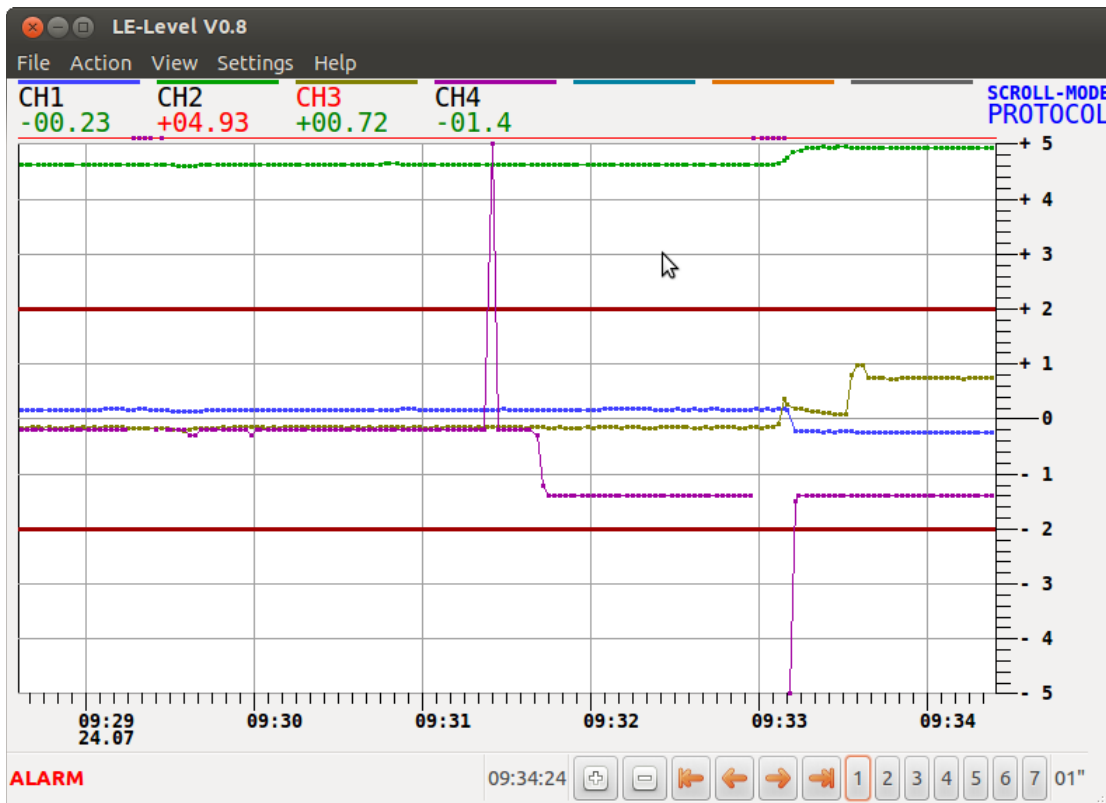
## Finishing of the preparations

- When the basic and protocol settings have been made, you can begin working with the program *LE-Level*. All settings and the measured data in the protocol are retained when the program is closed and are then available again immediately the next time the program is started. The data of the online diagram are lost when the program is closed and are generated new from the then current measured data.
- To exit the main *LE-Level* program, use the menu item *File->Quit*. The program returns automatically to the *LE-Level Start menu*. Please remember that the receivers only switch to power-saving mode and are not switched off completely.

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## Simple Work

- If *LE-Level* has been closed, restart it.
- Establish a wireless connection to the lasers with the menu item *Action->Start*. If the function *Setting->Autoconnect* has been activated, the connection is established automatically after 10 seconds when the program is started.
- Once connected, you can select the display you want with the menu *View*. The following displays are available:
  - *Bargraph*:  
The bar graph shows the current positions in text form as bars, the state of the battery and the channel designation.
  - *Online-Diagram*:  
The online diagram shows the measured data of the last few minutes as multi-coloured chart. The current state is also shown in text form in the top part of the diagram. The line colour for the channel is shown above the text.
  - *Protocol*:  
The protocol corresponds to the display of the online diagram. However, only the data saved in the protocol are shown in the chart.
- The chart can be saved as image file with the menu item *File->Screenshot*. You can save up to 99 image files in the data directory with ascending numbering.
- Close the program with the menu item *File->Quit* to return to the *Start Menu*.



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## Menu Items in Detail

- **File->Screenshot:**  
Generates a screenshot of the chart being shown. The generated file name is *LE-Level\_Screenshot\_##.png*, where ## is an ascending number from 01 to 99. The files are to be found in the *LE-Level* data directory.
- **File->Export:**  
Converts the protocolled data from the internal *LE-Level* format from the file *.LE-Level.data* to the database file *LE-Level.dbf*. Both files are to be found in the data directory. See the chapter *Data format* for a more detailed description.
- **File->Quit:**  
Terminates the wireless connection to the receivers and the *LE-Level* program. It is started again when starting via the *LE-Level Start menu*.
- **Action->Start:**  
Establishes the wireless connection to the laser receivers. *Connecting ...* is shown in the status line for about 20 seconds. The receivers must first be switched on in the mode *Cont. meas.+BT-Radio*. When the wireless connection is active, the keyboard of the receiver is disabled except for the light button to prevent operating errors. See also the menu item *Setting->Autoconnect*. The overall status is shown at the left edge of the status line.
- **Action->Stop:**  
Switches the receivers to power-saving mode and disconnects the wireless connection. If the receivers are no longer to be used, they must be switched off manually to prevent discharging of the rechargeable batteries.
- **Action->Beam Search:**  
Manual starting of the laser beam search for receivers without laser reception. The complete search process can take up to 40 seconds. In addition to this manual laser beam search, a laser beam search is started automatically every max. 128 seconds.
- **Action->Reset Alarm:**  
This function is used to reset an alarm. The alarm stays off until an alarm condition (limit value broken, laser or laser receiver failure, faulty measured values) is fulfilled again, albeit at least for the duration of the start delay set in *Setting->Alarm*.
- **View->Bargraph:**  
The bar graph shows the current receiver positions in text form and as bar graph. Display elements from top to bottom: channel number, measuring point or receiver status, optional descriptive text, diagram with coloured scale, limit value marking lines, indicator bar with scale arrow, battery state, channel status. When the power supply state is low, the battery state is shown in red. The indicator bar is also shown in red when a limit value has been broken. The bar graph is refreshed every second or so. The overall status is shown in the status line on the left. The last refresh time is shown next to it and then the remaining time until the next protocolling or the *store*

button.

Possible receiver state values:

- *OFFLINE*: The wireless connection to the receiver has not been established or has been interrupted. *LE-Level* tries to restore broken connections at regular intervals of time.
- *LASER ?*: The laser receiver is not receiving a laser beam. See also the menu item *Action->Beam Search*.
- *LIMIT*: Infringement of the laser receiver measurement range. It might be necessary to adjust the starting height of the receiver mechanically.

Possible channel state values:

- *DATA ?*: The connection to the receiver is disturbed.
- *ERROR !*: No valid laser position is being measured.
- *LIMIT !*: The current position infringes one of the set limit values.
- *OK*: No error. The position is valid and within the set limit values.

Overall status:

- *STOP*: The wireless connection is off.
- *Connecting ...*: Connecting the wireless connection.
- *ALARM*: The alarm has been activated because of a problem.
- *ALARM (Mem)*: An alarm occurred in the past. See also the menu item *Setting->Alarm*.
- *LOW BATTERY*: The battery of at least one receiver is almost empty.
- *DATA ?*: The position data of at least one receiver are not stable. (Is only used in the view *Online-Diagram* or *Protocol*.)
- *NO ERRORS*: Everything okay

• *View->Online-Diagram*:

In the *Online-Diagram* the measured data of the last few minutes are shown as multi-coloured chart. The current position/current receiver status is shown in text form at the top. The line colour of the channel is shown above the text as horizontal line. For highlighting purposes, the colour of a channel can be changed to black by clicking the channel designation or the highlighting buttons at the bottom of the window or with the buttons 1 to 7. When a battery is almost empty, the channel designation is shown in red. If invalid position values are received by a receiver, the measuring point appears on the thin red line above the diagram. If a range is broken, the measuring points are shown at the respective end of the scale. The + and - buttons are used to change the scale of the time axis. Except for the additional buttons, the information in the status line and on the receiver status corresponds to that described in *View->Bargraph*.

• *View->Protocol*:

The protocol corresponds to the display of the *Online-Diagram*. However, only the data saved in the protocol are shown in the chart. You can move around the protocol with the *left/right* arrow keys as well as with *Pos1, End* and the arrow buttons at the bottom edge of the window. If the protocol chart has been moved to the left (into the past), automatic refreshing is deactivated. This is indicated by the text *SCROLL-MODUS* in the top right corner. You can reactivate automatic refreshing again with the *End* key. The protocol chart is restricted to the last 50000 data records. To view parts further back in the past, you must export the data and view them with a spreadsheet program.

• *Setting->Receiver*:

In the *Receiver List* you can search for the receivers available and assign them to one of the 7 display channels.

- *Bluetooth-Scan*: The program looks for the laser receivers within the wireless range and updates the *Receiver List*.
- *Change channel*: The receiver selected in the *Receiver List* can be assigned to a display channel. The valid channel numbers lie in a range of 1 to 7. The value 0 is used for receivers that have not yet been assigned to a channel.
- *Delete entry*: This function is used to delete a selected receiver from the list. This is only possible if there is not yet a wireless connection to this receiver.
- *OK*: Closes the *Receiver List*.

• *Setting->Channels*:

The *Channel List* shows an overview of the settings for every channel. Table columns used:

- *Channel*: Consecutive channel number. If the channel has been assigned a receiver, its number is shown in bold type.
- *Label*: Optional description of the measuring position. The description is shown in the bar graph.
- *Zero Offset*: Active zero offset of the channel. The offset is the distance between the marking notch of the receiver and zero point.
- *Limit Min./Limit Max.*: Active limit values for alarm evaluation. If the limit value is not used, the field is empty.
- *Bargraph Scale Min./Bargraph Scale Max.*: Upper and lower end of scale for the bar graph.

• *Setting->Unit*:

Dimensional unit used. This unit is used throughout the program and in the receiver view to show the measured values.

• *Setting->Alarm*: Settings for alarm evaluation. The *Startup Delay* defines the time in which an error does not

trigger an alarm after the wireless connection is up.

The *Alarm on Delay* defines the minimum time for which an alarm condition must be active before the alarm is triggered. The *Alarm off Mode* switches saving of the alarm state. In *Manual* an alarm remains active until it is reset manually via *Action->Reset Alarm*. In *Auto* an alarm is cleared automatically when the cause of the alarm no longer exists.

The input field *Alarm Program* enables adjustment of the functions to be triggered when an alarm occurs. For details see the chapter *Alarm Program*. The standard program used is *le\_level\_alarm*, which triggers an audible signal when an alarm occurs. Note: Changed settings only become active after a restart of *LE-Level*.

- *Setting->Online-Diagram*:  
The scale of the measured value axis can be set under *Measuring Scale*. If *From Bargraph Settings*, the scale is calculated from the bar graph settings. The maximum and minimum of all bar graph scale values is used as maximum and minimum value respectively. If *Manual*, the scale can be defined independently of the bar graph.
- *Setting->Protocol*:  
For setting of the *Measuring Scale*, see the description in the section *Setting->Online-Diagram*. For automatic protocolling at fixed intervals of time, set the protocol mode on *Interval* and enter the protocolling interval you want in minutes or seconds. The permissible range lies between 2 seconds and 60 minutes. For manual protocolling, set the protocol mode to *Manual*. You can then save values to the protocol manually with the spacebar or *store* button. The item *Protocol Startup Delay* is used to set the delay from connection of the wireless connection via *Action->Start* to the point in time of the first protocolling. If the measured values are to be averaged during protocolling, the time range for calculation of the average value can be defined at *Average Calculation Time*. The permissible range lies between 2 and 120 seconds. Enter 0 to switch off averaging.
- *Setting->Autoconnect*: Here you can activate automatic wireless connection when *LE-Level* is started. This is useful if the measuring system is to be used for continuous monitoring and without supervision. Please note here that for this the computer must also boot automatically when switched on and *LE-Level* must also be started automatically by the operating system. See chapter *Autostart*.
- *Help->Help*:  
This function starts the default web browser with this program manual.
- *Help->About*:  
Shows the program version of *LE-Level*.

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## Project Management

- *Save project files*:  
We recommend that you save the project files after every use of *LE-Level* to prevent data being lost. To do so, exit the main *LE-Level* program and select the item *Save Project Files* in the *LE-Level Start Menu* and confirm with *OK*. A backup of the project files is made and the file name shown in a window. You can also copy the backup to an external data medium (e.g. USB drive) with the file manager.  
Tip: If this file is the last backup before the end of the project, we recommend that you first convert the protocol data to a *DBF* file with the export function.
- *Start new project*:  
Select the item *Delete Protocol Files* in the *LE-Level Start Menu*. Caution: The project data are lost. If they are still needed, you should first save them with the function *Save Project Files*.
- *Restore project*:  
In the *LE-Level Start Menu* select the item *Restore Project Files*. Please note that this deletes the current project files. Project backups created with other licence keys are not shown correctly (receiver channels without licence are empty). If this is the case, please contact *GEO-Feinmechanik GmbH* to adjust the licence data accordingly.

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## Files and Data Formats

*LE-Level* uses the following files. *Note*: Files that begin with a dot are normally not shown in the operating system's file manager. This can be changed in the file manager's *View* menu.

### In your home directory:

- *.LE-Level.keys*:  
The receiver licences are saved here in encrypted form. *LE-Level* only works with receivers for which a valid licence has been found. Do not delete or manipulate this file because otherwise you can no longer work with the program!
- *.LE-Level.keys.old*:  
Backup of the old licence key file before adding of new licence keys.
- *.LE-Level-Deleted\_Project.zip*:

Backup of the last project deleted.

## In the data directory of LE-Level:

- *.LE-Level.conf*:  
This file contains the current program configuration. To prevent inconsistent data, this file may not be changed manually.
- *.LE-Level.data*:  
The protocol data are saved in this file in an internal *LE-Level* format. This file is not suitable for editing with a spreadsheet program. For this, please use the menu item *File->Export* in order to generate a *DBF* file from these data.
- *LE-Level.dbf*:  
A protocol file converted via the menu *File->Export*. You can open this file with all common spreadsheet programs. Please note that the data in this file are not refreshed automatically. For this, export the data again. The data fields used are:
  - *Time* (time of protocolling)
  - *Date* (date of protocolling)

Every channel used also has the following fields:

( # = channel number between 1 and 7)

- *Estat#* (extended status information)
  - 0 -> Receiver is in sleep mode
  - 1 -> Beam search active
  - 2 -> Search delay running
  - 3 -> Beam search failed
  - 4 -> Laser reception, rough positioning
  - 5 -> Laser reception, fine positioning
  - 6 -> Laser lost
- *Stat#* (receiver status)
  - 0, 1, 2 -> Receiver with laser reception. The value indicates how good the measured value is (0 = good, 1 = average, 2 = unsteady).
  - 3 -> Laser reception OK, but position not exact
  - 4 -> No laser reception
  - 5, 6 -> Position outside the measurement range
  - 7 -> Internal receiver error
  - 9 -> Faulty data transmission
- *Pos#* (position information) The position in mm or inches. Number of decimals different depending on the type of receiver.
- *Time#* and
- *Date#* (time and date of the receiver data)  
If data transmission is okay, this time corresponds, but for a minor deviation, to the protocolling time in the fields *Time* and *Date*. Bigger differences only exist in the case of problems.
- *LE-Level\_Screenshot\_##.png*:  
( ## = consecutive number between 01 and 99) These files are created by *LE-Level* via the menu item *File->Screenshot*. They contain a screenshot of the diagram area. The resolution of this image file can vary depending on the window size setting. A maximum of 99 screenshots can be saved.
- *.LE-Level-Deleted.data*: Backup of the last protocol data deleted.

## In the backup folder *LE-Level-Backups*:

- *LE-Level\_Project\_?.zip*:  
( ? = date and time) Backup files in which project data are saved.

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## Alarm Program

The alarm program is used to carry out certain functions in the case of warnings or alarms. This can be set in the menu *Setting->Alarm*. The default alarm program is *le\_level\_alarm*. It emits various audible signals as warning or alarm depending on the state. Please make sure your PC is set to an appropriate volume because, if not, it is possible you might not hear the signals.

Alternatively to the audible alarms, you can also use the program *le\_level\_alarm\_sms*. This enables sending of SMS



messages when a new alarm is triggered. In the mode *Alarm Off Mode = Auto* an SMS is also sent when the alarm ends. When an SMS has been sent, a minimum time of 60 seconds is waited to give the mobile phone connected to the program enough time to send the SMS.

In order to use *le\_level\_alarm\_sms*, the program *gsm-utils* must be installed and a mobile phone connected to the PC such that it is ready for use.

Enter the following parameters under *Alarm Program* in the menu *Setting->Alarm: le\_level\_alarm\_sms -n NUMMER -d SMS-DEVICE*. *NUMMER* is the telephone number to which the SMS is to be sent and *SMS-DEVICE* the device connection for the local mobile telephone. Specification of the device connection ( *-d SMS-DEVICE* ) is optional.

Example: *le\_level\_alarm\_sms -n +4912312345678 -d /dev/ttyACM0* .

Alarm Settings

Startup delay: 60 sec

Alarm on delay: 10 sec

Alarm off mode:  Auto  Manual

Alarm program:

le\_level\_alarm\_sms -n +4912312345678

Hint: Restart program to activate changes. Blank entry to reset to default value.

Cancel OK

In order to be able to carry out other actions with own programs in the event of an alarm, the information transmitted by *LE-Level* must be evaluated correctly. The following data are transmitted by *LE-Level* to the alarm program with the default settings:

- ? -> Communication test. The alarm program must send ! as reply to *stdout*.
- I -> Initialisation. This is sent once when the program *LE-Level* is started.
- H -> Halt state. The wireless connection has been ended/not yet started.
- R -> The wireless connection to the receivers is being established.
- O -> Online data record of the receiver. Is sent once a second and contains the current status of the laser receiver. End of the data record by *\n (Linefeed)*.  
The following data fields are sent per receiver, separated by a comma:  
*Channel Number, Extended Status, Status, Position, Error counter for Missing Records, Invalid Position, Limit und Battery Warning* (Error counter values max. 999).  
The individual receiver data are separated from each other by the character | .
- P -> Protocol data record for finished interval.  
Like O, but only the following data fields are sent:  
*Channel Number, Extended Status, Status, Position*
- A0-> Alarm off
- A1-> Alarm on
- A2-> Saved alarm (an alarm was triggered in the past). See also the menu *Setting->Alarm*.
- W0-> Warning off
- W1-> Warning on (currently only for low receiver battery)
- Q -> Is sent when *LE-Level* is closed

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## Autostart

The following steps must be carried out for automatic starting without manual operation (e.g. for continuous monitoring):

- The laser receivers used must start automatically when the operating power is connected. This is possible in the case of *LE-71* and *LE-72* laser receivers by using a 12 V DC power supplies (available as accessory from *GEO-Feinmechanik GmbH*). The built-in rechargeable receiver batteries must then be removed beforehand.
- The laser must also start automatically. This is not normally the case with GEO lasers, but can be retrofitted as modification on request depending on the type of laser.
- Automatic starting of the PC when the mains power supply is connected must be switched on in the computer settings. This depends on the type of PC used. This setting is often not possible in the case of laptop computers.
- The operating system (*Ubuntu-Linux*) must boot automatically. Please note that the boot time can be longer if the computer was not shut down correctly (e. g. because of a power failure).
- To log in automatically when starting, activate *Automatic Login* in the operating system under *System Tools->System Settings->User Accounts* (must be unlocked with the user password).
- Add *LE-Level* to the startup applications. To do so open the operating system menu *System-Tools->Preferences->Startup Applications*, enter the text *LE-Level* in the input field *Name* and the program *start\_le\_level* in the input field *Command* and confirm with *Add*.
- In *LE-Level* switch *Setting->Autoconnect* to *On*.

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## Licence Key

The licence keys used are to be found in the file *.LE-Level.keys* in the home directory. If the file is missing or corrupt, *LE-Level* cannot be used. To install additional keys, please contact *GEO-Feinmechanik GmbH*. You will then be given a licence file, which you can then install via the item *Add Receiver Licenses*.

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## Troubleshooting

- No receivers found in Bluetooth scan:
  - Has the external USB Bluetooth adapter been plugged in properly or has the computer's built-in Bluetooth adapter been switched on?
  - Has *Cont. meas.+BT-Radio* been started in the receivers and is the wireless symbol flashing in the receiver display?
- Not all receivers found in Bluetooth scan:
  - Are the receivers too far away from the computer?
  - Has *Cont. meas.+BT-Radio* been started in the receivers and is the wireless symbol flashing in the receiver display?

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## Links

- [GEO LE-Level Monitoring Software](#)
- [GEO Software for LE-71 and LE-72](#)
- [GEO-Feinmechanik GmbH - Start page](#)
- [Ubuntu Operating System](#)
- [German Wiki Page on Ubuntu-Linux](#)

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