Limes Documentation and Manual

Limes Documentation and Manual   **1**

General   **1**

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General

General Information

This Help contains general and special information for LMT LIMES 2000 software.

LMT LIMES 2000 LIght MEasurement Software for Windows

Please ask for further information about LIMES 2000:

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E-mail: limes@lmt.de
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If you have any questions regarding the use of the LMT LIMES 2000 software, or experience unexpected problems which cannot be solved by using this Help information, please also send a description of your problems to the stated e-mail address. Please be aware that support is only possible if you submit the complete version number of the Limes programs you are currently using, e. g. Limes.exe 3.4.605

> *Note:*
> *You find the version number either by using the Version menu or by using the Windows explorer.*
> *Right-click on the file name of the executable file, then select properties, version, file version.*

Content of documentation

The documentation provided with the LMT LIMES 2000 software consists of five major chapters:

- ❑ General information
- ❑ LIMES Reference Manual
- ❑ LIMESCONTROL Reference Manual
- ❑ Special Applications Manual
- ❑ Translator Manual

The **General Information** consists of descriptions of the functionality and the concepts of the LMT LIMES 2000 software. It contains information about installation, updating and upgrading, as well as description of the photometrical principles used in the programs.

The **Reference Manuals** consists of 2 parts:

- ❑ LIMES Reference
- ❑ LIMESCONTROL Reference

The LIMES Reference allows the user to get direct information about the windows, menus, buttons, and other tools used to navigate through the Limes program., while the LIMESCONTROL Reference does the same for the LimesControl program.

The **Special Application Manual** describes the use of the road lighting calculation function of the Limes program.

The **Translator Manual** describes the use of the LIMES Translator program for simplifying the translation of LIMES items into other languages

The documentation available as on-line help and can be accessed by pressing the F1 key while running the LMT LIMES 2000 software or by using the help items of the main menus.

The printed documentation can be ordered from LMT. It is also available in electronic formats, generally as Adobe Acrobat PDF file. Copies of this document can be downloaded from a special website. A suitable user-ID and password for an access to this site can be obtained from LMT on request, or is send to the users per email.

Release

Title

LMT LIMES 2000 Documentation and Manual

Release

3.4.605

Date

June 2004

Changes since last release

Several modifications and additions have been added to this document in order to follow the development of the LIMES 2000 software. Besides minor changes the following items have been added:

- ❑ Start LIMES program
- ❑ Applications management
- ❑ Select test data
- ❑ Select test programs
- ❑ Set test data values
- ❑ Set program values
- ❑ Lamp databases
- ❑ Delayed test program execution
- ❑ Zero-compensation
- ❑ Hardware options
- ❑ User-information

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> *Note:*
> *This release covers the content of the LMT LIMES 2000 software with the same version and release number. Any modifications in further software versions and releases, which cannot be found in this documentation, will be available on request from LMT, usually in an electronic format to be downloaded from the LMT's web server.*

Changes

Changes since last release

Several modifications and additions have been added to this document in order to follow the development of the LIMES 2000 software. Besides minor changes the following items have been added.

General information

- ❑ Databases: More detailed information about databases used in LMT LIMES 2000 software
- ❑ Functions concept: More information about special device test functions, e.g. color and reflex measurement
- ❑ Applications concept: About different applications management
- ❑ Photometrical principles: C-plane correction
- ❑ How to… Test headlamp cleaning devices

Installation

Installation

General

The installation of the LMT LIMES 2000 software is performed by the setup program on the LMT LIMES 2000 CD.

It is strongly recommended that all other Windows programs are terminated before the Setup program is executed.

> *Important Note:*
> *For the primary installation of LMT LIMES 2000 software it is absolutely necessary, that the user is logged into Windows as Administrator, otherwise the installation is cancelled by the Setup program.*

To start the installation usually it is only required to insert the LMT LIMES 2000 CD into the CD drive of the PC. If the autorun capability of Windows has been switched of, select the Setup.exe on the CD-ROM and execute it.

Follow the instructions of the Setup program:

- ❑ Select the installation language (English or German only)
- ❑ Accept the license agreement
- ❑ Select Full Installation, if you install for the first time

If, as in the full installation, hardware drivers are installed, the Setup program will ask you to re-boot the computer when the installation is finished.

> *Important Note:*
> *If the LMT LIMES 2000 software requires a reboot, it is absolutely necessary to reboot the computer before you use the LMT LIMES 2000 software for the first time*

If only the Items.exe (Limes Translator Program) is installed, or certain software updates are installed, it is not necessary to re-boot the computer, and there will be no request from the Setup program.

Start setup

Insert the LIMES 2000 CD. If Windows Autorun is enabled, the Setup program will be started automatically. If the Setup does not start, you can also use the Run Program function in Windows start menu or double click on the file Setup.exe in the Windows Explorer view of the CD.

Note:
The message above is displayed in the language of your operation system

Setup screen

The Setup screen shows the version and revision number of the LIMES software to be installed. The version of the setup program is displayed in the lower right corner.
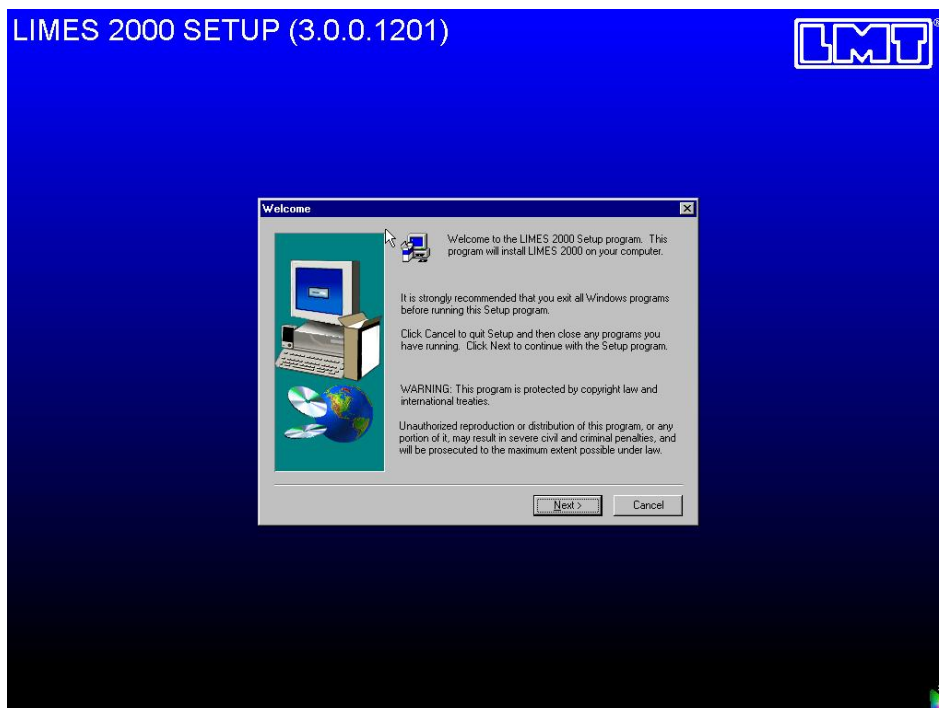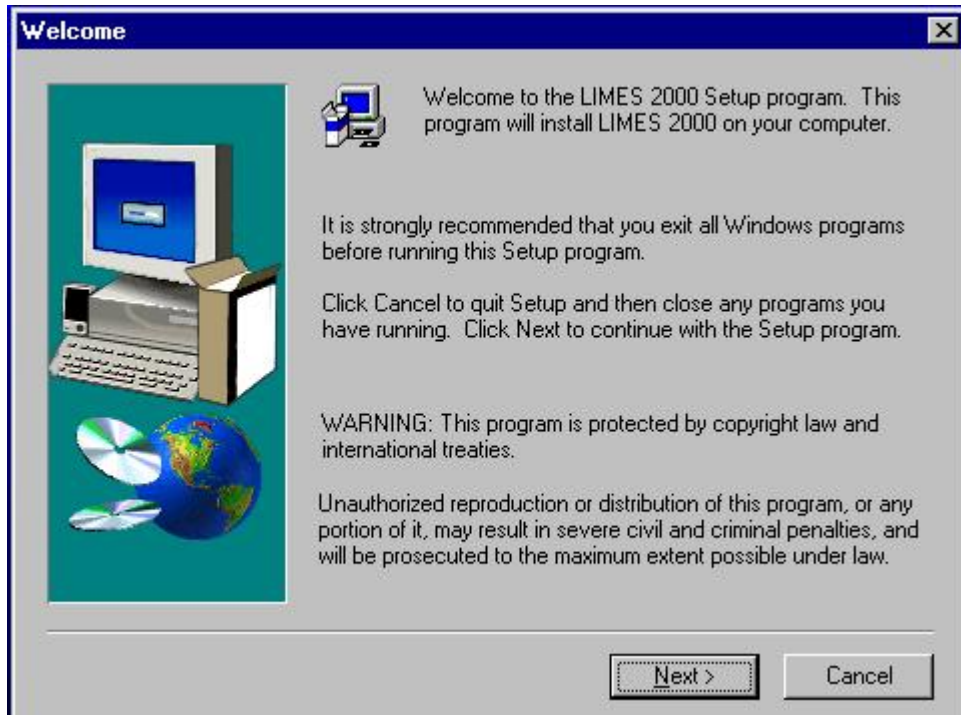
Please follow the instructions. Exit from setup if you have other Windows application programs running and close them, because you might to have to reboot your computer when the setup is finished.

Select Next to continue the setup program. Click on Cancel to exit from Setup.

In case of canceling a message appears and informs you that you can either exit from Setup or resume (continue the installation).

To continue Setup, click on Resume. To terminate without any installation of software click on Exit Setup.

Setup Welcome

Please read and confirm the license agreement in the next message;

Software License Agreement

Please read the following License Agreement. Press the PAGE DOWN key to see the rest of the agreement.

*** LICENSE AGREEMENT ***

BEFORE PROCEEDING WITH THE INSTALLATION AND/OR USE OF THIS SOFTWARE, CAREFULLY READ THE FOLLOWING TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT.
BY INSTALLING OR USING THIS SOFTWARE YOU INDICATE YOUR ACCEPTANCE OF THIS AGREEMENT. IF YOU DO NOT ACCEPT OR AGREE WITH THESE TERMS, YOU MAY NOT INSTALL OR USE THIS SOFTWARE!

This Software is owned by LMT Lichtmeßtechnik GmbH Berlin. This Agreement does not provide you with ownership of the Software or right to distribute the program, but only a right of use as outlined in this license agreement.

YOU ARE SPECIFICALLY PROHIBITED FROM CHARGING, OR REQUESTING

Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install LIMES 2000, you must accept this agreement.

[< Back]   [Yes]   [No]

Choose destination

As default the Setup program will install the software in you program folder, usually to be found as C:\Program files. Here a folder \LMT\Limes 2000 will be created. All the software will be installed into this folder, unless you select a new destination folder by clicking on the Browse button.

Choose Destination Location

Setup will install LIMES 2000 in the following folder.

To install to this folder, click Next.

To install to a different folder, click Browse and select another folder.

You can choose not to install LIMES 2000 by clicking Cancel to exit Setup.

Destination Folder
C:\Programme\LMT\Limes 2000   [Browse...]

[< Back]   [Next >]   [Cancel]
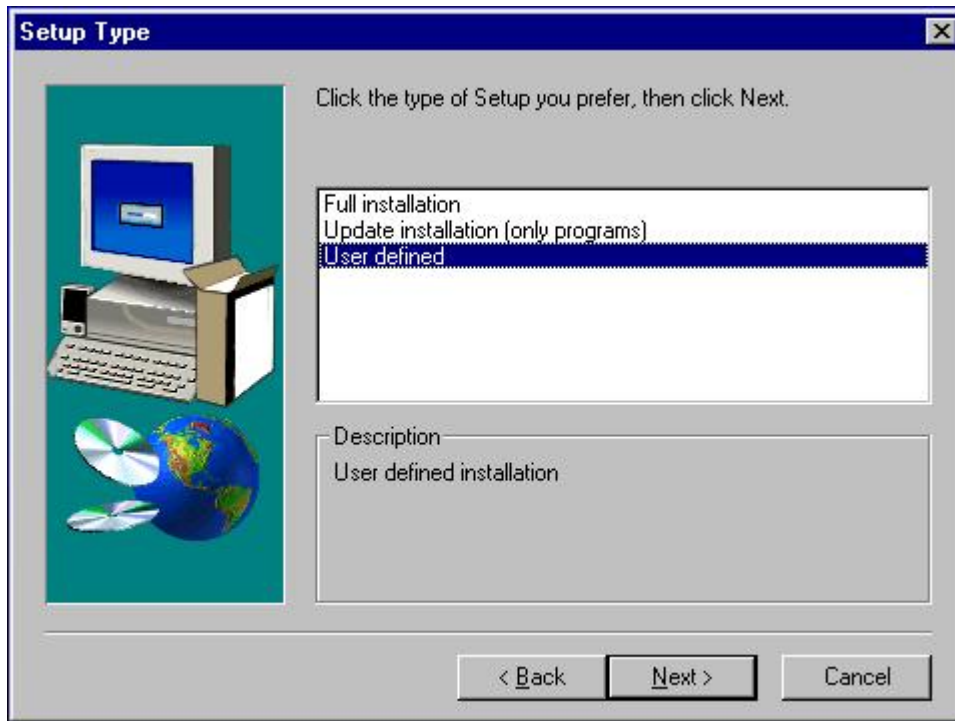
Select setup type

You can select between the following setup types:

- ❑ Full installation
- ❑ Update installation (only programs)
- ❑ User defined

The full installation will install the complete software, all auxiliary files and the drivers for the GP-IB interface board LMT-GTI iPC488-L

The update installation will only install the executable files and DLLs. This is only recommended if one of these files was destroyed or damaged.

The user defined installation allows you to select the components you want to install. Selecting all components has the same effect as using the full installation.

> *Note:*
> *You should use User defined if you are going to use a different IEEE-488 interface board, such as National Instruments GPIB-PCI, or if you are installing a Demo-Version without access to LMT measurement instruments*

Select components

This window appears only if user defined installation was selected.

Select Components ✕

Select the components you want to install, clear the components you do not want to install.

☑ IEEE 488 driver	113 K
☑ LIMES Translator	642 K
☑ LimesControl	2508 K
☑ Limes program	14364 K
☑ Databases	4487 K
☑ Soundmessages	24481 K
☑ Helpfiles	95925 K

Select All   Clear All

< Back   Next >   Cancel

Note:
You should use not mark the field in front of the IEEE 488 driver if you are going to use a different IEEE-488 interface board, such as National Instruments GPIB-PCI, or if you are installing a Demo-Version without access to LMT measurement instruments

Select Components ✕

Select the components you want to install, clear the components you do not want to install.

☐ IEEE 488 driver	0 K
☑ LIMES Translator	642 K
☑ LimesControl	2508 K
☑ Limes program	14364 K
☑ Databases	4487 K
☑ Soundmessages	24481 K
☑ Helpfiles	95925 K

Select All   Clear All

< Back   Next >   Cancel
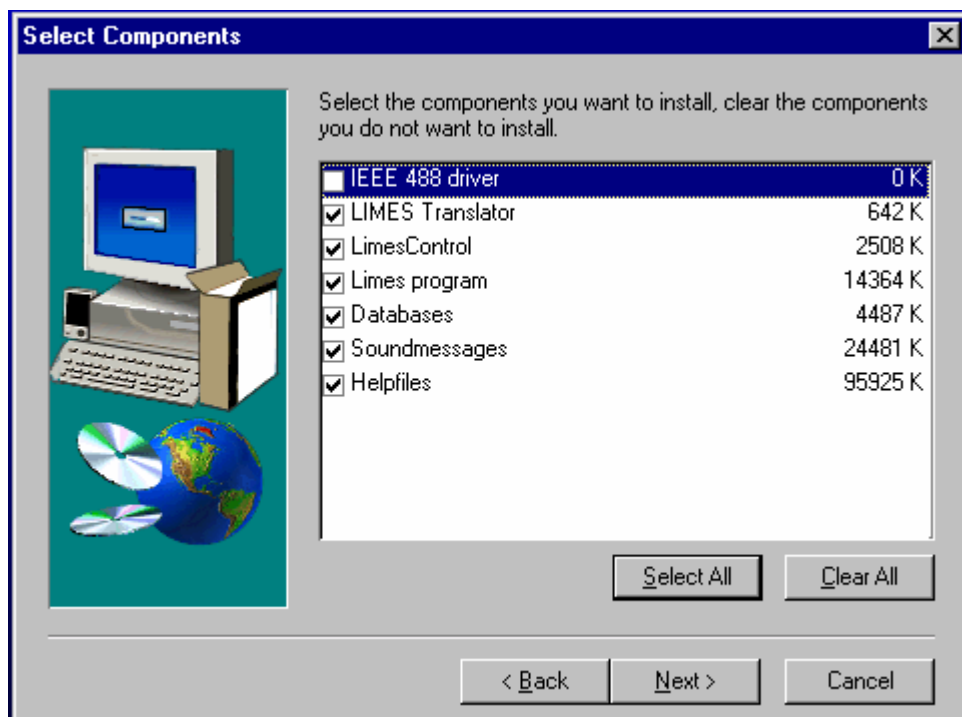
Select files and databases

This window appears only if user defined installation was selected.
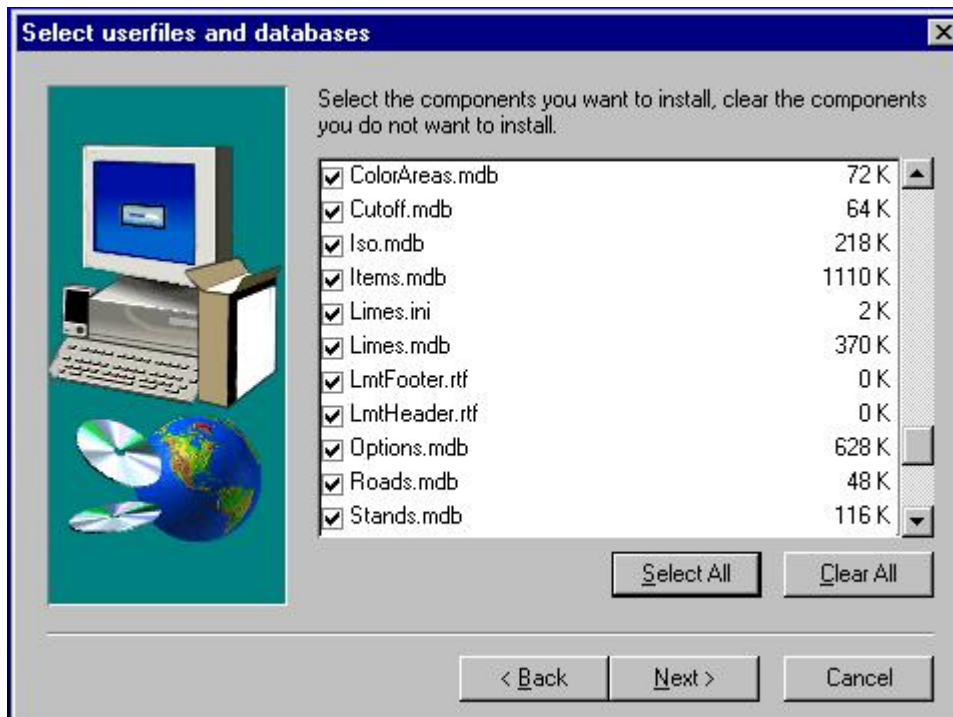
For a full installation click on Select All.

Select program folder

Select the program folder in your start menu, where the links to the executable files will be saved.

The Setup program will also create 3 icons on your desktop for the 3 main programs

❑ Limes.exe (Main software)

❑ LimesControl.exe (Hardware communication)

❑ Items.exe (Translator)

You can delete these icons later from the desktop if you don't like to much icons there. It is recommended that you leave the icon for the Limes.exe program, as you will be able to execute the other program directly from the running Limes program.

Start copying files
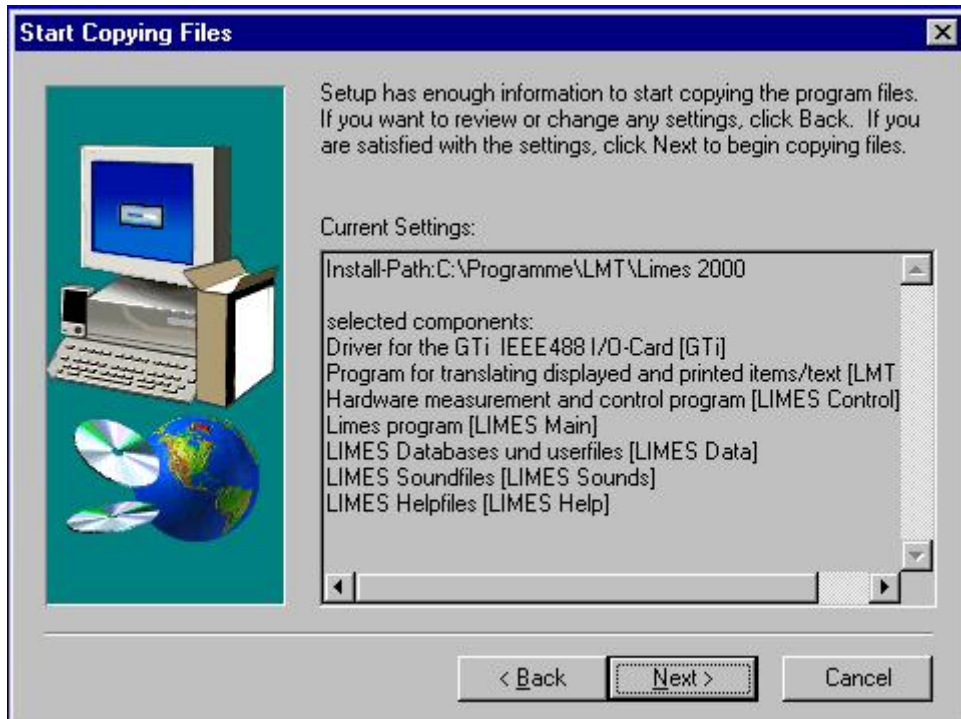
After you click on Next, the installation will start. This is the last chance to exit from the Setup program without any modification to your system.

Copying files

The Setup program will now copy the files to your computer, install all drivers and register the software in your Windows registry.
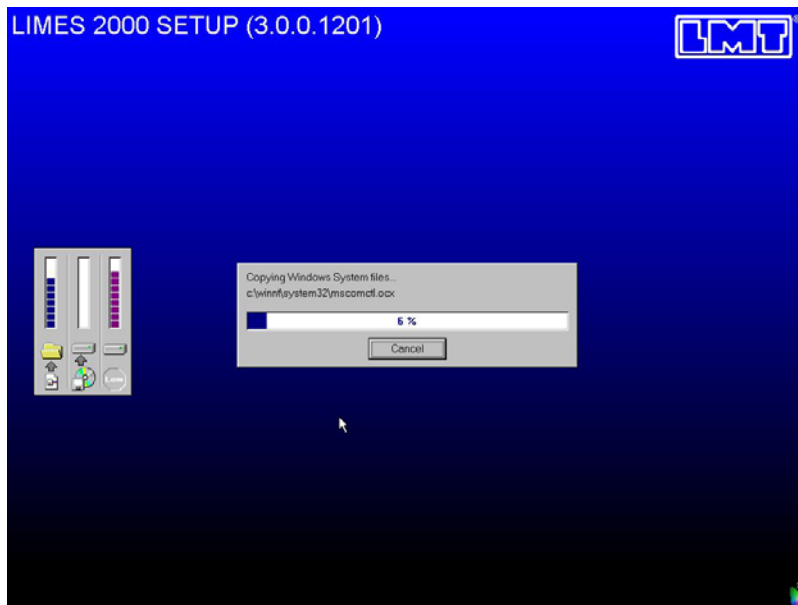
If you interrupt the setup, you have to re-install from the beginning.

Updating your Windows system

The Setup program installs the entries in the start menu and finishes the update of the Windows registry.

Setup complete – please reboot

When the setup is finished, the Setup complete message is displayed. If you have selected to install interface drivers, or if your Windows system did not contain the database access drivers, you have to re-start Windows before you can use the LIMES software.

Setup complete without reboot

When the setup is finished, the Setup complete message is displayed. If you have not selected to install interface drivers, or if your Windows system did contain the database access drivers, you do not have to re-start Windows before you can use the LIMES software. This is usually the case if you install a Demo-Version which is not using the interfacing to LMT measurement instruments.
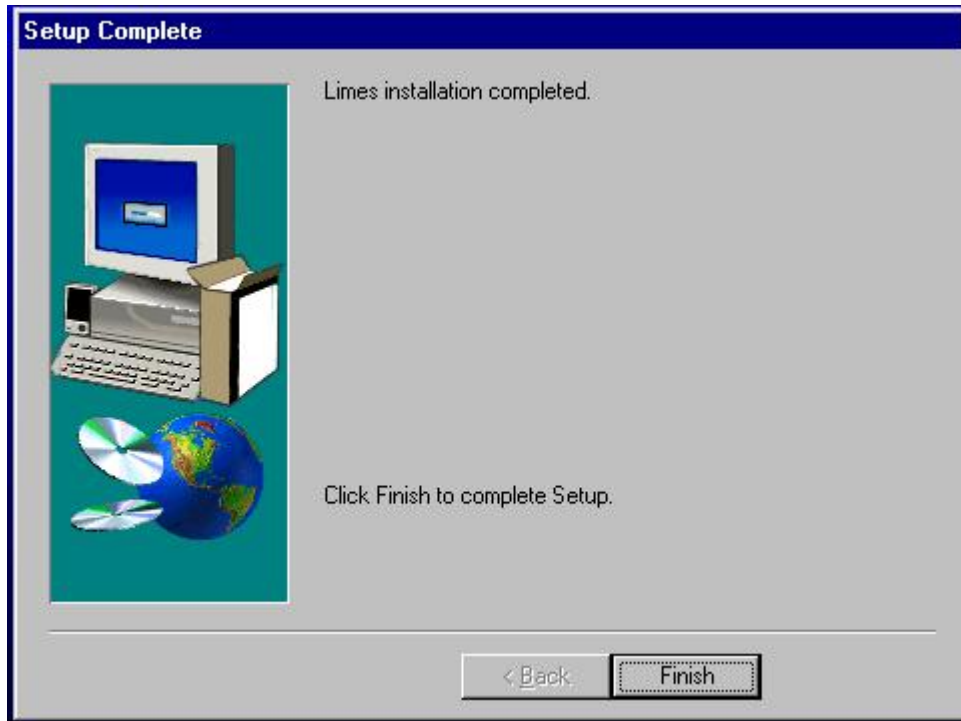
Start LIMES 2000 now

You are now ready to start your LIMES 2000 software for the first time on your computer. Please refer to the Getting Started section of this manual to get instructions about First Start.

Setup has created 3 icons on you desktop, if you had chosen to install all three programs.
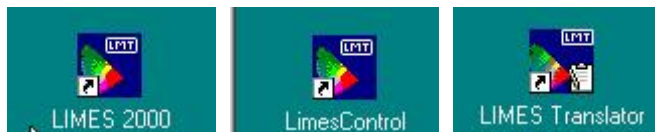
You should click on the LIMES 2000 icon to start the LIMES software for the first time.

Getting Started

This section gives information to help the user, if the LMT LIMES 2000 software is started for the first time.

Before you start either the LIMES 2000 (limes.exe) or LIMESCONTROL (limescontrol.exe) programs, you have to attach the hardlock provided with the software on the printer port on the computer.

If you have a printer connected to this port, disconnect it, attach the hardlock and fix it firmly with the two screws. Then connect the printer cable to the socket on the hardlock again and fix it as well.

When the LMT LIMES 2000 program is executed the first time, and after the initialization of the program is finished after a couple of seconds, the user has to select the default operation language and to enter the default user password. After this it is recommended to check the options setting of the program, especially for the connected hardware.

Start LMT LIMES 2000

To start the LMT LIMES 2000 software you can

- ❑ Select LMT LIMES 2000 from the Windows Start Menu
- ❑ Click on the LIMES 2000 Icon on your desktop
- ❑ Select Execute from the Windows Start Menu and enter Program files\lmt\limes2000\limes
- ❑ Open the Windows explorer, open the folder Program files, then the folder LMT, then the folder Limes2000, then double click on Limes.exe

LMT LIMES 2000 Start screen

The LIMES 2000 start screen shows the process of initializing the databases, reading the registry setting, reading the hardware setting in the .ini-file, etc.

LMT LIMES 2000 Version 3.0 Revision 1204
LMT Light Measurement Software

Copyright © LMT Lichtmesstechnik GmbH Berlin 1997-2001

LMT LIMES 2000 for Windows NT 4.0 / Windows 2000 - International Version

LMT LIMES 2000 is the product name for LMT Light Measurement and Evaluation Software with LMT Goniophotometers and other Photometric Instruments

0000-0000-0000-0000

A status information bar at the bottom informs you about the process. The initialization may take a minute, if Limes is executed for the first time, or after an update installation. The average time for regular start is much shorter, ab. 10 to 20 seconds depending on the performance of your PC.

The displayed text in this screen is always in English. The bottom line shows the serial number of the connected hardlock. If a line like 0000-0000-0000-0000 appears, your hardlock is not attached, or the Sentinel driver has not been started. In the latter case you have to repeat the installation, otherwise check the connection and repeat the program start.

Operation language

The initial default language setting is English. You may select any other of the listed languages (German, French, Italian, Spanish) as a new default language. The default language is used for all information displayed during the program operation and also for the printed reports until manually changed.

To select a language click on the name in the upper Operation language list.

The default language can be changed any time later by selecting Options/Language from the main menu.

LMT LIMES 2000 Splash screen

The splash screen is displayed for a couple of seconds and disappears automatically. It can be recalled by using the Limes main menu Help/Info.

Logon

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The default setting requires the user to login with a valid password. For logon the very first time, the user name and password is empty. It is recommended, that you logon with a password. You also can enter the user specifics like company name and address.

The user password can be changed any time later by selecting Options/Login from the main menu.

> *Note:*
> *When you have entered a valid password, you are requested to confirm it again. Please enter the same password again, be careful that you are using exactly the same spelling.*

After entering the password you get a confirmation display, which has to be closed by clicking on the O.K. button.

Welcome to LMT LIMES 2000

After starting for the first time, or after installing an update, you see a Welcome screen.
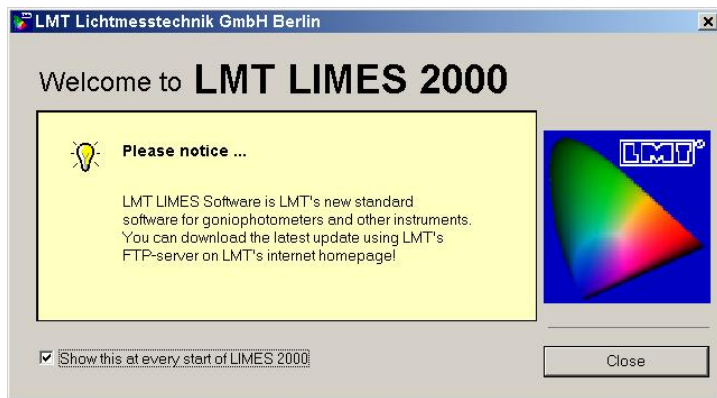
You can close this screen by clicking on the Close button. If you leave the check box with the message 'Show this at every start' checked, this screen appears at every new program start. If you don't want this screen again, clear the check mark.
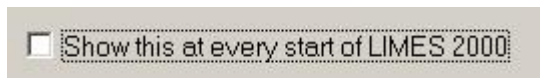
Welcome to LMT LIMES 2000 Demo-Version

If a LIMES 2000 demo-version has been installed, after starting you will always see a Welcome screen indicating the maximum time for trial.
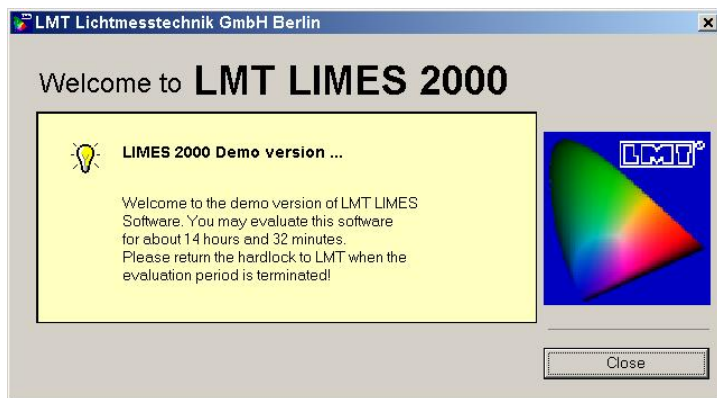
Limes main window

The final screen is the Limes main window, from which most of the functions of the Limes program can be executed by either using the main menu or the toolbar.
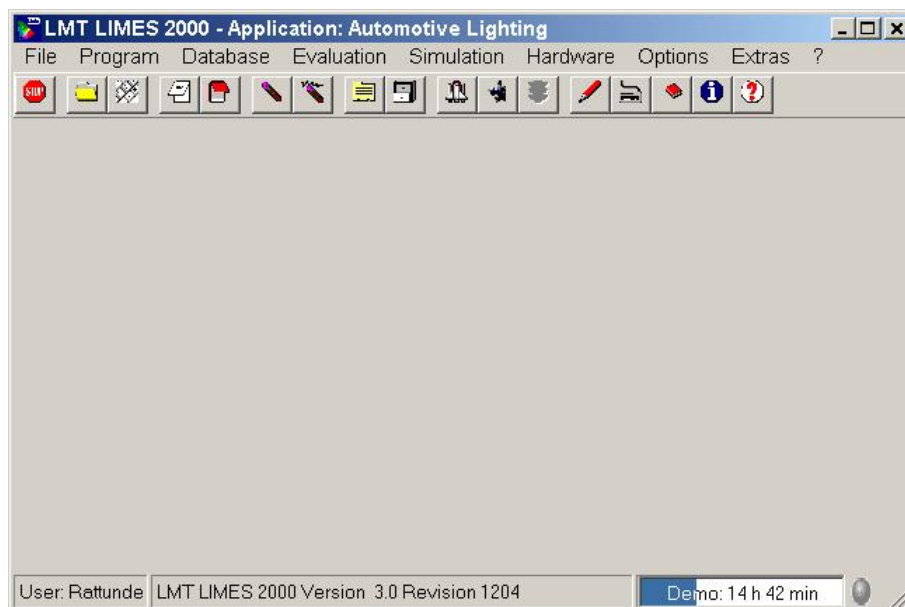
Note:
The LIMES main window for demo-version displays the timer period left for program execution.

Settings

It is recommended to check all settings at the first start. You can use the Options menu from the main program menu.
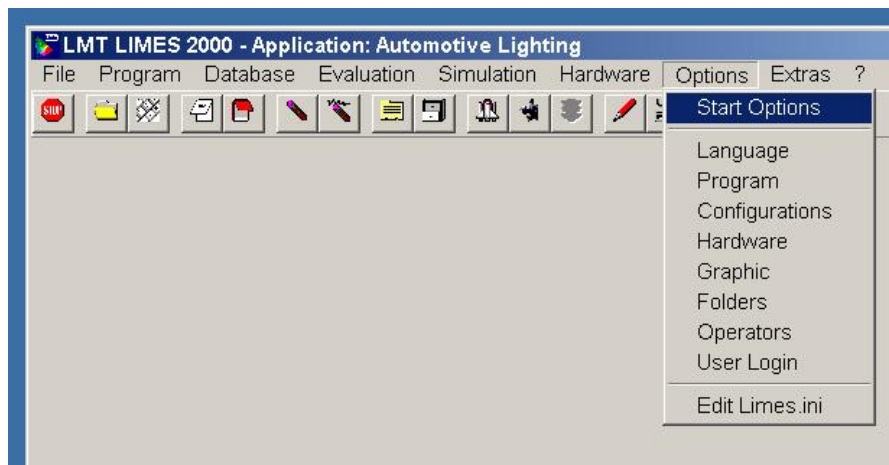
Attention:
The default setting of LMT LIMES 2000 has the hardware disconnected from the system. To allow real operation with a goniophotometer or any other hardware connected to an interface the hardware must be connected first. This is to be done in the menu Options/Hardware, where the corresponding checkbox has to be checked.

Make sure that all hardware settings match with the properties of your connected hardware, especially:

- ❑ Interface device addresses
- ❑ No. of photometer heads

❑   Measurement ranges

and that all devices shown in the device list and marked as available are really available in your system, turned on, connected by the interface cables and ready for remote control.

Hardware settings

The default settings when using LIMES software for the first time, is that the hardware is disabled. This means that there will be no communication with the hardware, even if you have LMT instruments connected to the interface. This will also be the future setting for a Demo-Version without instruments. If you want to do real measurements with LMT instruments, you must first enable the hardware and save these settings.
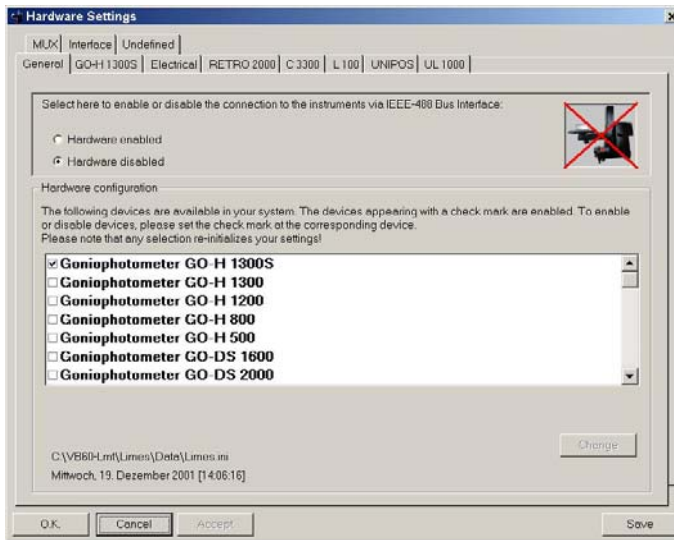
> *Note:*
> *The following settings can be done, if your system consists of the same type of goniophotometer as in the following examples. If you have different instrument, please refer to the hardware options of this instrument in the LIMES Reference manual*

After this select the hardware options a second time and continue with the configuration of the instruments.

Goniophotometer settings

To modify the settings click on the tab for the goniophotometer.
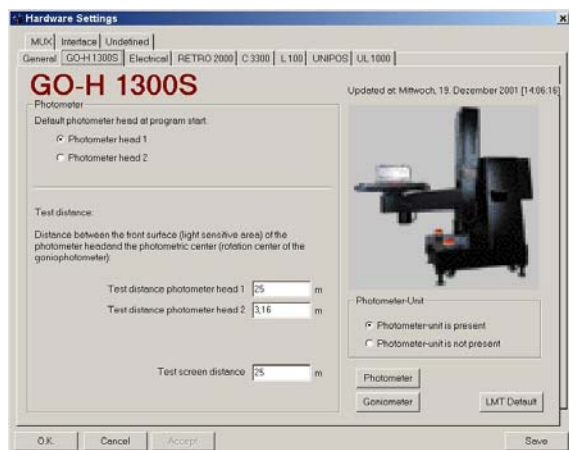
Click on Photometer for setting the properties of the photometer head.

Photometer configuration

It is very important that the properties for devices are correct. Please check al these settings and compare the values you see in the input fields with the actual settings of your hardware.

Please also refer to chapter hardware settings of your LIMES Reference manual.
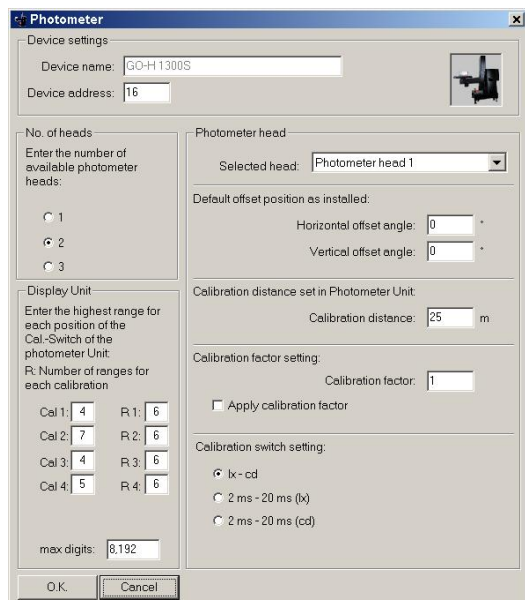
Goniometer configuration

As a next step check the settings of the goniometer as well. Make sure that the marked options are correct and available in your hardware.

Goniometer

Device settings
Device name: GO-H 1300S
Device address: 17

General
Mounting position:
Horizontal: 0 °
Vertical: 0 °

Intermediate parking:
Horizontal: 0 °
Vertical: 45 °
☐ Enable intermediate parking

Endswitches:
H-End: 195,00 °
V-End: 92,00 °

More ...

Positioning
Enter the angular differences for speed control:
H1: 20   V1: 5
H2: 250 V2: 40
H3: 750 V3: 80
H4: 900 V4: 150
H5: 1200 V5: 250
H6: 1500 V6: 300

Speed
Enter the angular movement speed in s/180°:
H1: 2700 V1: 3600
H2: 180 V2: 900
H3: 31   V3: 150
H4: 14   V4: 90
H5: 10   V5: 65
H6: 8   V6: 45
H7: 7   V7: 35

Switches
☐ Lights on/off switch available   Relay: 1
☐ Warning sign on/off switch available   Relay: 2
☑ Goniometer beeper on/off switch available   Relay: 3 for 1 s
☐ Test lamp signal on/off available   Relay: 4

O.K.   Cancel

Power supply configuration

Check the power supply settings, if you have a power supply or an electrical measurement instrument in your system which shall be controlled via the interface.

To see more details, select the instrument (if more than one) by clicking on the name in the list field, and then press more.

Again, please also refer to chapter hardware settings of your LIMES Reference manual.

Hardware Settings

MUX | Interface | Undefined
General | GO-H 1300S | Electrical | RETRO 2000 | C 3300 | L100 | UNIPOS | UL 1000

Electrical
Updated at: Mittwoch, 19. Dezember 2001 [14:06:16]

Default settings for electrical instrument
HP 6038A (HP)

HP 6038A (HP)   60 V   10 A

Default
More ...

☑ Use electrical instrument in LimesControl

Setting
Set Voltage: 13 V ⦿ Set
Current limit: 5 A ○ Set

Lamp Switch 1/2
☑ available
Relay: 4

Ramping
○ Slow
○ Medium
⦿ Fast
○ Switch

Use Power Supply
HP 6038A (HP) for the first lamp
HP 6038A (HP) for the second lamp

Default lamp
⦿ Lamp 1
○ Lamp 2

O.K.   Cancel   Accept   Save

Other instruments

If you have other types of LMT measurement instruments in your system, also check all parameters in the corresponding fields and compare them with the actual settings of your hardware. Check especially for

❑ Interface device addresses – compare them with the device addresses listed in the hardware manuals of the instrument

❑ Measurement ranges – compare tem with the ranges of your instrument by switching the range knob on the instrument panel and check the readings

❑ Options – Check if the options selected in the LIMES window are available in your instrument, otherwise correct the settings

Interface selection

Check if the proper interface board is available. Click on the interface tab of the hardware settings window. Select the interface you are going to use from the pull down box.
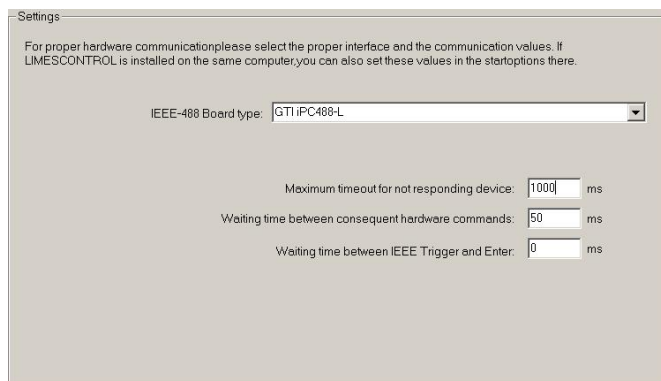
If you have a fast measurement system, such as any LMT goniophotometer, you can set the maximum timeout to ab. 1000 ms. Otherwise use the default value of 10.000 ms.
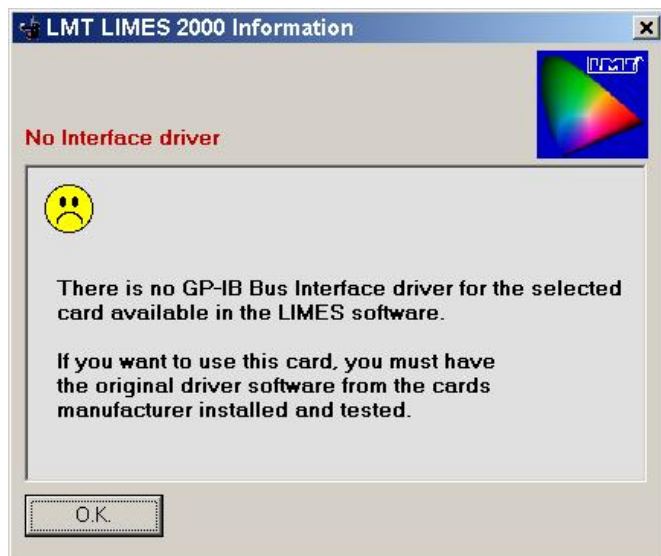
If you select any other than the GTI-iPC488L interface, you will immediately get the message show above. This is to remind you, that the LIMES 2000 software does not contain any other driver for interface boards than the LMT's GTI-board.

> *Note:*
> *If you want to use any other of the supported interfaces, you have to install the software for this board prior to the first use with the LIMES program. You have to make sure that your board is properly installed and that the driver works properly.*

Save configuration

If you have done any modifications, click on the Save button to save your modified settings into the Limes.ini file. After successful saving you get a message. You can mark the check box to omit this message in the future, when you made more changings and saved them.

Re-initialize the LIMES program

After changing modifications it is recommended to re-initialize the LIMES program.
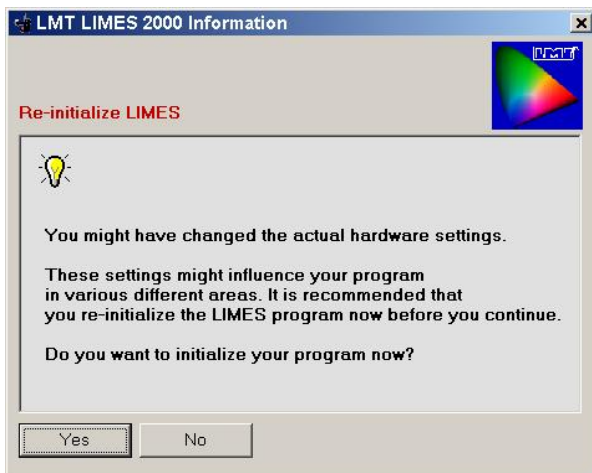
Click on Yes and wait a couple of seconds for re-initialization of the LIMES program.

Select configurations

You can do now already change some of the default configurations of the LIMES program. If you are familiar with the LIMES software, you can also do now any other changing in the default settings. For newcomers it is recommended to change settings later when the program is in practical use.
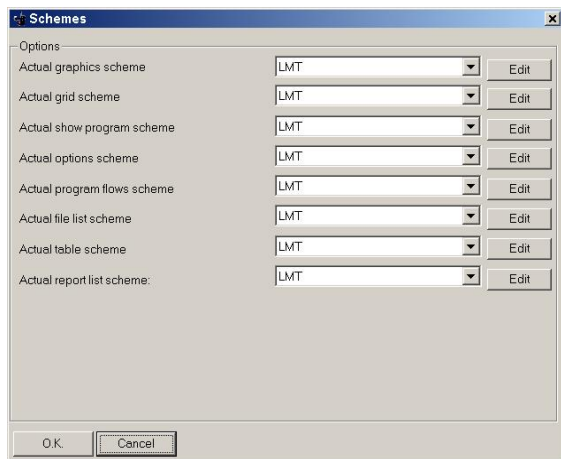
Define an operator

It is also recommended to create a new entry for an operator of the program. Please look for details in the chapter Operators in the LIMES Reference manual

Select Options/Operators from the LIMES main menu.
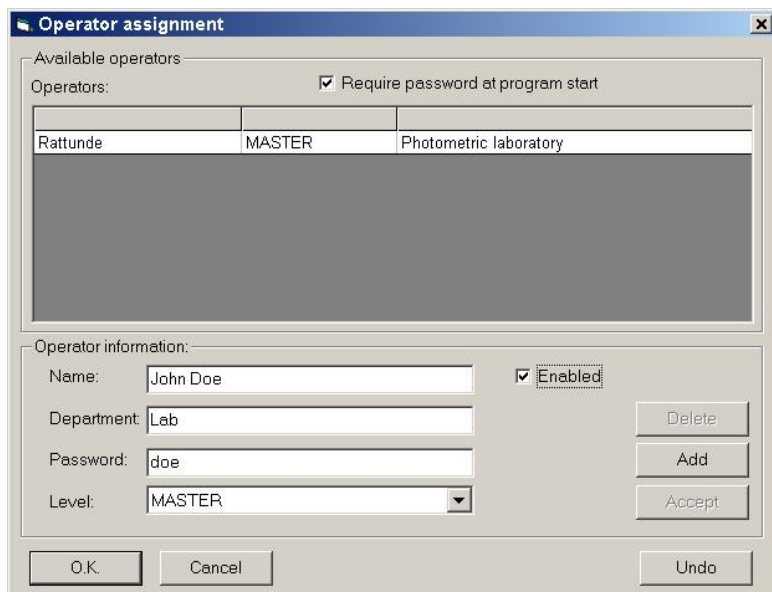
Enter your name and department. Enter a password with at least one character (letter or any other printable character), which any user logged in as master can read and change again.

Also mark the Enabled box and than click on Add.
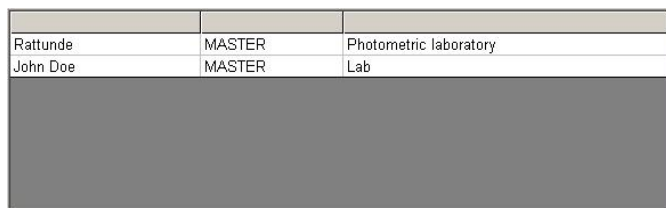
You name appears in the list. When you start LIMES the next time, you can now log in with your new password.

Exit Limes and re-start

You should now terminate the LIMES program. Click on the File menu, select Exit, or click on the Exit sign (the left most icon in the main tool bar).

After this re-start LIMES as before and login again.

Connect to LimesControl

When you have logged in, and the initialization of the program is complete, you can now connect to the LimesControl program.

Select Connect from the main menu or click on the Connect icon in the toolbar.
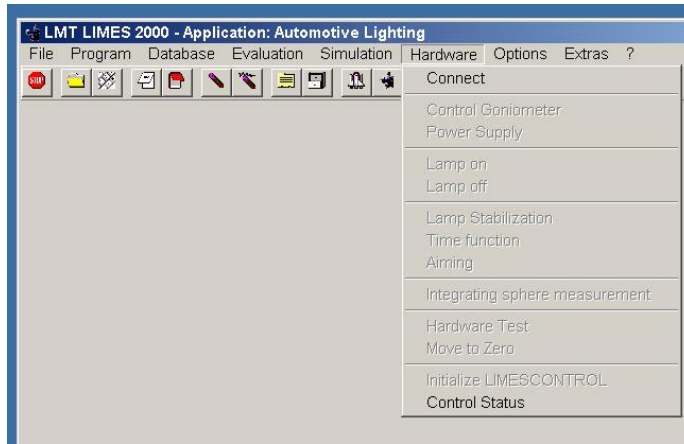
Auto start LimesControl

If you have not started the LimesControl program by its own icon or by the Windows start menu, you can start it now by confirming Yes.
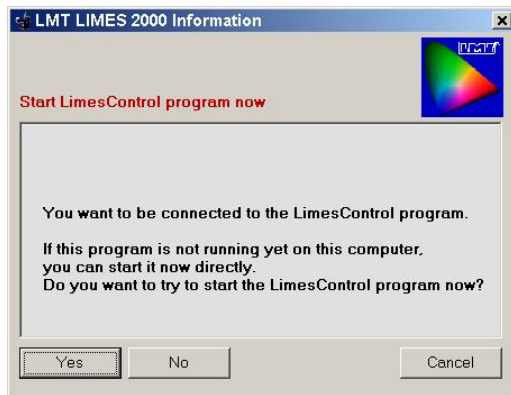
The LimesControl program will start, show its welcome screen and is now connected to the LIMES program

Check condition of the LimesControl program

If the header bar of the LimesControl program window is shown like this, the LimesControl is configured to communicate with the measurement instruments via the interface board.

If the header bar of the LimesControl program window is shown like this, the LimesControl is configured to simulate the measurement. The instruments may be connected via the interface board, but no actual communication is done.

LimesControl was started

After successful start of LimesControl you get the following message, which you can omit in the future.

LimesControl was started in simulation mode

If you have started the LimesControl program in simulation mode, you will get a message any time the program attempts to read from a device or control a device via the interface. These actions will be replaced by simulated reading, usually the data is read from an existing file containing measurement data of some test sample.
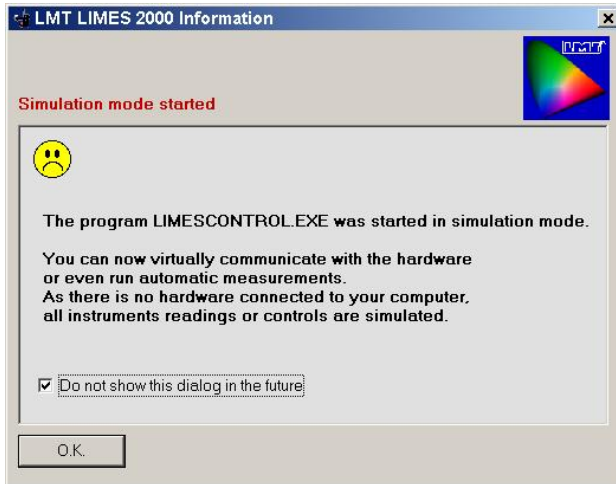
Please disable this message otherwise it will continue to appear on your screen.

Select hardware test in LimesControl

To work with the LimesControl program you have to login. This is done by clicking anywhere on the LimesControl window with the right mouse button. After login the message disappears. Now you can click again with the right mouse button on to the LimesControl window. This time a pull down menu appear and allows you to select the Hardware test.

> *Note:*
> *The pull down menu appears as long as you are logged in. To logout click on the Login menu.*
> *Enter nothing in the login password input field. If you exit, you are logged out. To login again, click*
> *again as mentioned above.*

Perform hardware test in LimesControl

After you selected Hardware test the Hardware test panel appears. The content depends on the devices which are available in your system. Click on the tab of the device you want to test.
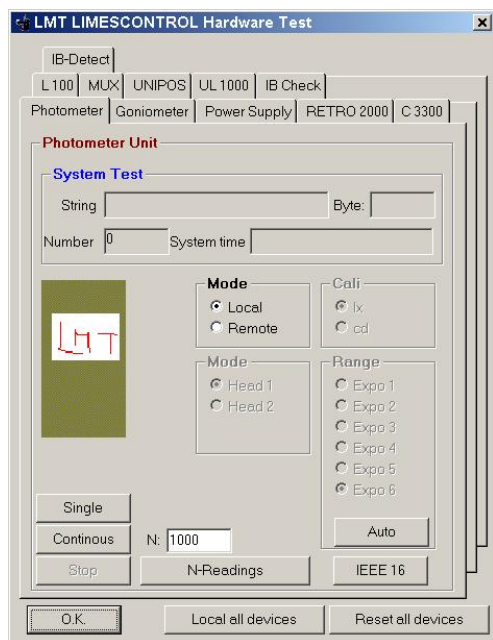
Perform single measurement

To test a goniophotometer the first time click on the Single button to perform a single reading from the goniophotometer. The goniophotometer should be switched on. When your instrument is ready and connected to the interface of your computer, in a fraction of a second the returned data from the goniophotometer is displayed in the String-line.
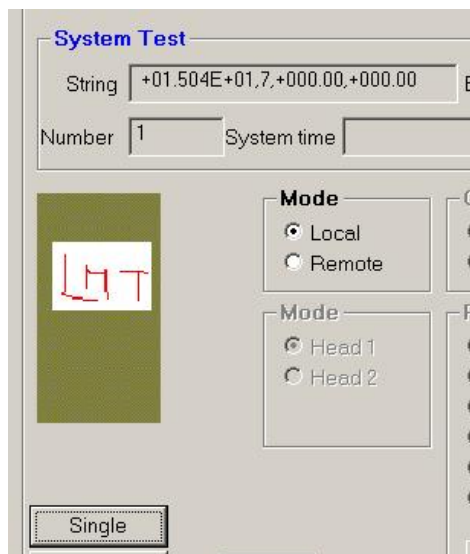
If you get a message that the reading failed and some interface error appears, your instrument is not properly connected. Please check device addresses, the cable connections, and refer to the hardware test section of the LimesControl Reference manual.

Set LimesControl in Auto start mode

If you want to start your LimesControl program automatically when you start the LIMES program, you can select Options from the LIMES main menu, then Program.
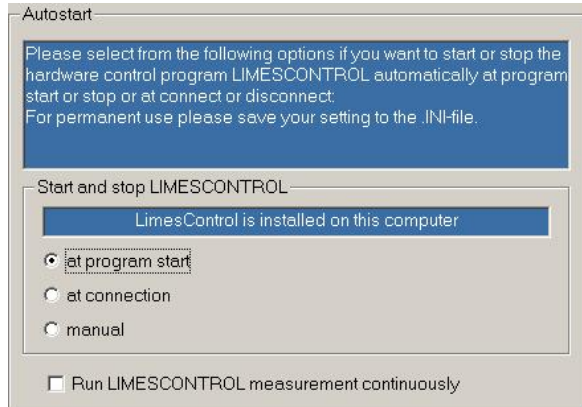
Enable the mark in front of the "at program start" text.

The auto start will be available from next time you start the LIMES program. When you shut down LIMES, also LimesControl will terminate automatically when it was started automatically, but now you have to terminate LimesControl manually by clicking on the Windows program exit icon on the top right corner of the LimesControl window.

Run the LIMES program and perform a test

Now you are ready to run a test program from the LIMES program and do a real test with the instruments. Refer to the How to chapter of this manual to see how to perform an automatic test or evaluate existing data.

Maintenance

LIMES Updates

LMT is continuously working on expanding the capabilities and the performance of the LIMES 2000 software. Usually every couple of weeks a new release will be available. Users of LMT LIMES 2000 can download an update from the LMT's web server at LMT's web site. A suitable user-ID and password for an access to this site can be obtained from LMT on request, or is send to the users per email.

Updates are executable files. When they are executed, a setup program is started which performs the installation of the update automatically.

Limes Upgrades

An upgrade of the LMT LIMES 2000 software is necessary, if the user requires certain capabilities which are not included in the version originally ordered from LMT, e.g. if a new measurement device with its special software has been purchased, or if additional user licenses are obtained from LMT.

Upgrades are provided as special upgrade files on flexible disks or other media, or send electronically attached to an e-mail.

The user has to perform the upgrade by using the functions provided in the Limes software, which are located in the options section Program of the main menu.

Program Information

Basic Concept

General

The LMT LIMES 2000 software is a 32-bit software designed to be executed under Windows NT 4.0, Windows 2000 Professional, Windows XP or higher. Under certain circumstances it can also be used under Windows 95/98, depending on the type of connected hardware (measurement equipment).

The LMT LIMES 2000 software consists of 3 major components, which are saved as executable files:

- ❑ Limes.exe
- ❑ LimesControl.exe
- ❑ Items.exe

Limes

The Limes program is the main program. It is executed from the Windows Start menu by using the entry LMT LIMES 2000. The Limes program generally performs the following tasks:

- ❑ Management of test sample and test program data
- ❑ Import and export of data files
- ❑ Execution of photometrical tests
- ❑ Evaluation of measurement data
- ❑ Printing of test protocols and reports
- ❑ Execution of simulation programs
- ❑ Modifications of settings for hardware and software
- ❑ Execution of Limescontrol.exe and Items.exe programs

The Limes program can be installed on the same computer which contains the Interface connection to the hardware (control computer), or on any other computer which is connected to the control computer via a network (UDP-Protocol).

The execution of the Limes program is not real time dependent, therefore any other software can be operated on the computer at the same time.

Multiple copies of the Limes program can be executed on the computer at the same time, but only the Limes.exe which was started at first can communicate with the hardware control program LimesControl.

LimesControl

The LimesControl program performs the interface communication with the connected hardware. It must be installed on the same computer which hosts the IEEE-488 Bus Interface board.

The LimesControl program can be executed from the Limes program, or can be executed directly by selecting the LimesControl icon from the Windows Startmenu.

The LimesControl program generally performs the following tasks:

- ❑ Communication with the connected hardware via the drivers of the IEEE-488 Bus Interface
- ❑ Display of readings of the connected instruments
- ❑ Execution of test routines for checking of settings or troubleshooting in case of hardware communication problems
- ❑ Execution of measurement tasks provided by requests of the Limes program on the same or a remote computer
- ❑ Transmittance of measurement data on requests to the Limes program on the same or a remote computer

Only a single copy of the LimesControl program can be executed on a computer at the same time.

The LimesControl program can operate in a simulation mode, if no hardware is connected to the computer, or if no interface is present. This option is usually used for demonstrations or testing of measurement programs.

Translator

The Items.exe (LIMES Translator Program) is the translation program for all items, which are displayed or printed during the operation of the LMT LIMES 2000 programs.

The Items.exe program can be executed from the Limes program, or can be installed and executed separately on a different computer.

The Items.exe program works with the database Items.mdb, and can import or export test items from other databases in the proper format or from certain ASCII text files.

Configurations

Depending on the application or on the connected hardware, the LIMES software can perform complete different tasks.

The major configurations are

- ❑ Measurement and evaluation of automotive lighting
- ❑ Measurement and evaluation of lamps and luminaries for general lighting

Supported hardware

The LMT LIMES 2000 software supports a number of photometrical and electrical measurement and control systems, provided that the proper hardware control modules are installed:

- ❑ Goniophotometers GO-H 500/800/1200/1300/1300/1400
- ❑ Goniophotometers GO-V 1900
- ❑ Goniophotometers GO-DS 1600/2000
- ❑ Goniophotometers GO-FI 2000
- ❑ Goniophotometers GO-QX 2000
- ❑ System photometers S 1000

- Photocurrent meters I 1000
- CCT Computer Controlled Table for GO-H 1300/1400
- Lamp multiplexer for GO-H 1300/1400
- Telecontrol for all goniophotometers
- Retro reflex measurement units RETRO 1000/2000
- Colorimeters C1200/1210/2200/3300
- MUX multiplexers
- L 100/1000 Luminance meters
- X-Z-Units
- Integrating spheres U 1000/1500/2000
- DC Power supplies HP 6038 and others
- DC Power supplies with SCPI operation software
- AC Power sources HP 6812 and others
- Various electrical measurement instruments

File Formats and Databases

The LMT LIMES 2000 software generally uses databases for data storage, which are compatible to Microsoft Access database format. More information is given in the section Databases in this manual.

Individual test sample data or program files can be imported from or exported to ASCII test files in a special LMT LIMES format.

Several standard file formats are supported by the LIMES software, depending on the configuration of the system. More information is given in the section File formats in this manual

Features

The LMT LIMES 2000 software contains the special features:

- Editing and saving of settings for test programs in databases
- Configurations of optional settings and saving under user defined names for various purposes
- Automatic execution of test programs as program flows
- Burning-in (Stabilization) of lamps prior to measurement

Special Features for automotive lighting applications

- Automatic measurement acc. to regulations with checking of fulfillment of requirements for minimum or maximum values
- Scanning of angular areas in equidistant and non-equidistant steps with saving of the light distribution as illuminance or intensity tables
- Multiple distributions within one file
- Automatic measurement of cutoff and sharpness of ECE headlamps

Special Features for applications with color measurement

- ❑ Measurement of color distributions
- ❑ User defined color areas of CIE color diagram for evaluation of color limits
- ❑ Color calculator for calculation of color values in different color systems (CIE, CIELUV,CIELAB, Correlated Color temperature)

Special Features for general lighting applications

- ❑ Scanning of angular areas in equidistant and non-equidistant steps with saving of the light distribution as intensity or intensity per 1000 lm tables
- ❑ Multiple distributions within one file
- ❑ Measurement selectable in C-planes or on cone surfaces
- ❑ Special measurement routines for luminous flux measurement

Special Features for applications with luminous flux measurement

- ❑ Saving of lamp and lamp flux data in compatible databases for use with measurements of general lighting luminaries or automotive headlamps or signals with goniophotometers

Copy protections

The LMT LIMES 2000 software is copy protected with special hardlocks (dongles). To operate either Limes.exe or LimesControl.exe program, the proper hardlock with the corresponding serial number of the software has to be connected to the parallel interface connector of the PC.

The necessary drivers (Sentinel) are automatically installed during the software installation (setup) procedure.

The Items.exe program is not protected, when installed alone it does not require a hardlock.

Demo-version

The LIMES 2000 software is available for trial or demonstration. This version of the software has generally the full capabilities of the licensed versions, with the exception that it can only be used for a limited period of time.

> *Note:*
> *The time period is usually a couple of hours. The available time is always displayed on the LIMES main window*

As also the LIMES demo-version are protected by a hardlock, this key provided by LMT with the software has to be installed any time the LIMES software is started.

When the trial time is running out, a message appears (usually about 30 in before termination). After terminating the maximum trial time, the software cannot be started anymore. Please use the Windows software settings to de-install the LIMES software from the computer.

Please also return the useless hardlock to LMT.

Functional Concept

The functional concept describes the way of functioning of the LMT LIMES 2000 software.

This contains the following subjects:

- ❑ Network
- ❑ Language
- ❑ Files
- ❑ Test programs
- ❑ Test lamps
- ❑ Lamp stabilization
- ❑ Program flows
- ❑ Evaluation
- ❑ Configuration
- ❑ Printing
- ❑ Operator

Databases

There are several databases used from the LMT LIMES 2000 software, which are compatible to the Microsoft ACCESS database format. Some databases are created by default and are given a name from the program itself, but can be renamed by the user. Also new databases of all kinds can be created by the use.

Database files have the extension .mdb (Microsoft Data Base). There is one exception: each system requires the presence of a special user database (extension .udb), which cannot be accessed or edited from programs like Microsoft ACCESS or EXCEL.

> *Note:*
> *The user database file (.udb) is maintained only by the program itself, any modification to it or removing of this database file from the system will cause the software to stop working.*

The following default databases are available, depending on the application of the LMT LIMES 2000 software and its installed components.

Limes.mdb	Test data, test program and test lamp database
Lamps.mdb	Test lamp database
Options.mdb	Start options and settings for the LIMES program
Iso.mdb	Isolux or iso-candela values
Stands.mdb	Stand databases for test sample holders
Autos.mdb	Automobile databases with definitions for automotive road lighting simulation
Roads.mdb	Road databases with definitions for automotive road lighting simulation

File formats

The following file formats are supported by the LMT LIMES 2000 software and are available to the user, depending on the application and the configuration of the software.

Automotive lighting:

LIMES ASCII format	default extension .atf	LIMES 2000 ASCII file format
LMT-GOH for DOS	default extension .asc	GOH ASCII file format

General Lighting:

LIMES ASCII format	default extension .atf	LIMES 2000 ASCII file format
LMT-GONIO for DOS ASCII	default extension .asc	GOH ASCII file format
EULUMDAT	default extension .ldt	EULUMDAT format
EULUMDAT2	default extension .ldt	EULUMDAT/2 format
IESNA 1986	default extension .ies	IESNA 86 format
IESNA 1991	default extension .ies	IESNA 91 format
IESNA 1995	default extension .ies	IESNA 95 format
CIE	default extension .cie	CIE Publication 102 1993
CEN	default extension .cen	CEN 13032 Part 1
TM14	default extension .tm1	CIBSE Technical Memorandum TM 14
LTL	default extension .ltl	Norsk Belysning Format

Functional Concept

Functional Concept

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- ❑ Test lamps
- ❑ Lamp stabilization
- ❑ Program flows
- ❑ Evaluation
- ❑ Configuration
- ❑ Printing
- ❑ Operator

Network concept

The LMT LIMES 2000 software is divided into three different executable programs:

- ❑ LIMES: Limes.exe main program
- ❑ LIMESCONTROL: LimesControl.exe hardware control program
- ❑ TRANSLATOR: Items.exe translation program

In the most typical application all three programs are installed on one PC with the operating system Windows NT 4.0 or higher. This is made by using the Full installation option in the Limes Setup program.

It is possible to install each program on a different computer, which are connected in a network and communicate with each other via the TCP/IP or NetBUI network protocols. Another possibility is the connection via file transfer.

Installation on different computers

The purpose of these concept is to enable the user, to prepare and perform measurements from one computer from his office, while the LimesControl program is running on another computer in the laboratory.

It is one of the great disadvantages of the Windows system based on Intel processors, that an external device cannot easily interrupt the processor if required by the external (photometric) device.

For slow measurement systems, such as integrating spheres, retro reflex measuring devices, etc., this causes no specific problems. Today's computers are fast enough so that the typical time delays are in ranges of milliseconds and do not influence the measurement.

This is different with a system containing a moving machine such as a goniophotometer. During movement any angular position and the corresponding photometric value must be read almost in real time, when the goniometer passes the required position.

If on the control computer another program is executed, it can happen that this program requires processing time in just the moment where a photometric reading is required, than causing a missing of the values. This can especially happen at long complex processes (graphical operations, printings, modem operations, etc.). Because of this **it is recommended not to execute or at least not to work with other programs**, especially if big amounts of data are processed.

The Limes program execution however has not time critical processes with the measurement. Therefore usually no problems occur with other software being executed on the same computer at the same time.

Connection via UDP protocol

During execution of measurement programs the Limes and LimesControl.exe program must be able to communicate with each other, they must be connected.

The Limes program has no interface connections to the measurement hardware. To perform a test measurement, it sends instructions to the LimesControl program. The LimesControl program communicates with the measurement hardware via IEEE-488 Bus Interface, controls the instruments, reads the photometric or other values, and delivers the required results back to the Limes program for evaluation and data processing.

The connection between Limes and LimesControl is performed by using a certain network protocol, known as UDP (Unified Data Protocol). In a UDP connection Limes is installed on one computer, the local computer, and communicates via the so-called local port. The LimesControl is installed on a computer called the remote computer, and communicates via the so-called remote port. Ports are network devices which are defined by port numbers, which are assigned to the ports as integer values.

Local and remote computer can be the same machine, when Limes and LimesControl are installed on the same computer.

Local and remote computer can be different machines which must be connected in a network system. The kind of connection is meaningless, it can be by network boards or by modems via telephone lines.

Computers are defined by there names in the workgroup or domain of the Windows network.

In LMT Limes start options default port numbers are used, 49152 for the local and 49153 for the remote port. Usually there are no conflicts with other ports in the network system, so these values should not be changed by the user.

Before the communication between Limes and LimesControl can be started, the connection has to be established. This can be done automatically or manually according to the settings in the Limes program options.

A manual connection can be made from the Limes main menu or a button on the Limes toolbar. LimesControl can be disconnected automatically when the programs terminate, or manually using the Limes menu or toolbar button.

If the connection is established, it is indicated by a colored circle on the bottom right hand corner of the Limes program, and at the bottom of the LimesControl program.

Connection via file transfer

This connection is the second choice, if the network connection fails. Instructions, commands, and results are saved from both programs Limes and LimesControl into temporary files on a folder specified in the Limes program start options.

The file transfer is much slower than the UDP protocol, which should be the preferred connection.

> *Note:*
> *If the network connection fails, and Limes and LimesControl program are on different computers, communications via file transfer could be impossible.*

Language concept

LMT LIMES 2000 programs can be operated in different languages, any printed report can be created in a different language as well. The default languages are either English or German.

Operation in a language:

Each text which is displayed during the operation and has been created by the LMT LIMES 2000 software, is saved under a language name in a language items database (usually Items.mdb). This text can be translated into any other language or modified by the user with the help of the LMT LIMES 2000 program Items.exe.

It is not necessary to translate every item in the database, if a new language is created. If the user wants to operate at least some parts of the software in e.g. Danish language, or have some messages to be displayed in this message, the procedure would be as follows:

❑ With the translator program the user creates a new language "Danish"

❑ The user translates all items important for him from one of the available languages into Danish

❑ In the Limes main options menu, submenu Language, he selects Danish as the operating language, and English as the alternative language.

If during operation of the program, a window or a message is displayed which shows text that has been translated in Danish, this text is displayed in Danish now. If the translation is not found, the text as found in the alternative language is displayed.

Creating a new language does not necessarily mean a language like 'Danish" or "Swedish". As it refers to a data set in the text items database, it can also be a language like "MyOwnEnglish", where the user can save text maybe in English as well, but with different wording from the default text created by LMT.

Example:

Assume the user want to change the wording for "Test sample serial number" to be changed into the text "Companies internal product number", he creates a new language, translates the original item to the new item, and uses this new language as default, the original English as alternative. Whenever the program displays a window which contains this text, the new phrase is shown instead of the old one, the rest of the text remains unchanged.

Printing in a language:

Each text printed in a report or shown in a printed graphic can be selected from on of the available languages in the language database as well, like the operation language, but independently from it. The default printing language is equal to the operating language. When a report is printed and the user sees the Limes report setup window, he can select a different language before printing. All reports printed afterwards will be done in this selected language, also at any next program start, until this language is changed again.

It is possible to translate only items used for printed reports into other languages.

Responsibilities:

When a user changes a text by translating into another language, it is his responsibility to observe certain rules:

❑ The length of the translated text should match the original text supplied by LMT, for formatting problems at the display during program operation.

❑ The meaning of the text should not be changed to avoid confusion

❑ Certain characters like the "pipe" character cannot be used

❑ Use of different character sets for different localized operating systems may cause problems for printing

Files concept

A file is a set of data related to the test sample, e.g. a luminaire, a lamp, a floodlight, an automotive headlamp, a signal lamp etc. A file consists of the following components:

- ❑ Description information (name, date, number, digital photo, purpose, etc.)
- ❑ Lamp data (lamp name, nominal and actual fluxes, electrical data etc.)
- ❑ Test program
- ❑ Test results

A file can contain no lamps (if the sample is material, e.g. a reflex material sample), a single lamp (bulb) such as an automotive stop lamp, a single lamp with two filaments (such as an automotive headlamp), 2 single lamps (such as an automotive headlamps), or multiple lamps (such as an interior luminaire with 2 or 4 fluorescent tubes, or an automotive signal lamp with 3 compartments).

A file contains one test program which defines the functions with which the measurement data (test results) where measured.

A file can contain test results, after it has been measured with its measurement program (test program)

A file is saved in a database, which is compatible to MS-ACCESS database format. Files can also be exported as ASCII files in single files on a medium such as hard disk or flexible disk. ASCII files can be opened with any editor like NOTEPAD. Databases can be opened with MS ACCESS or EXCEL.

A file is created by either editing (creating the data in certain windows) with the Edit functions of the LIMES software, or by reading from the test sample database or from an external ASCII file.

The LIMES program can open more than one file at the same time. The last file opened is held as the Actual file in the computers memory, the other files are kept in a stack in the memory. The number of opened files is not limited.

Files which have test results can be evaluated. The evaluation is automatically done with the actual file, but all files in the stack can be evaluated at the same time as well.

Test program concept

A test program consists of a program header and at least one program function. The program header contains general information about the general parameters used for the test, while the functions contain the instruction about the measurement procedure. A test program can contain a practically unlimited number of individual functions.

Examples of header content:

- ❑ Name
- ❑ Description
- ❑ Purpose
- ❑ Created at (date and time)
- ❑ No. of lamps in test
- ❑ Nominal fluxes for lamps under test
- ❑ Program flow
- ❑ …

Examples of functions contents:

- ❑ Point measurement
- ❑ Horizontal line scan
- ❑ Vertical line scan
- ❑ Horizontal scan
- ❑ Vertical scan
- ❑ Maximum search
- ❑ Integration
- ❑ Measurement on cone surfaces
- ❑ Measurement on planes
- ❑ Color measurement
- ❑ Retro reflex measurement
- ❑ Luminance measurement
- ❑ Text line
- ❑ Pause
- ❑ …

For each function specific parameters are given:

- ❑ Description
- ❑ Printed text
- ❑ Angular ranges (start, stop, step)
- ❑ Measurement units (lx, cd, cd/klm)
- ❑ Save distribution
- ❑ Required min/max values
- ❑ …

Execution of a test program

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The execution of a test program is the actual photometric measurement of the characteristics of a test sample.

The execution of a test program is a part of the program flow which includes steps like ramping lamps, stabilizing lamps before measurement, saving of measurement data or printing reports automatically. The actual measurement is done by execution of the test functions of a test program under control of the general parameters (parameters of the test program header) and special parameters (parameters of the test functions).

Test functions are executed in the given order one after the other. During execution the Limes program sends the instructions for measurement defined in the function to the LimesControl program. LimesControl performs the photometric measurement according to these instructions and delivers the measurement data back to the Limes program. Limes displays the data and performs the necessary data processing required by the individual function, e.g. comparing the measurement data with the given minimum or maximum requirements.

A test function can also be executed individually after selection from the user.

Test lamp concept

A test lamp is a set of data which belongs to a certain lamp (bulb) to be used in a lighting device (luminaire, signal lamp, headlamp). Test lamps are stored in a lamp database or as a data subset in a test sample database.

Lamp data usually is maintained independent from test sample data. If a new test sample data set is created, the required lamp data are entered by loading the corresponding lamp data from the database.

Lamp data contains information about then following items:

- ❑ Name
- ❑ Purpose
- ❑ Description
- ❑ No. of filaments
- ❑ AC or DC lamp
- ❑ Nominal (supply voltage/current)
- ❑ Nominal luminous flux
- ❑ Actual voltage/current (results from measurement)
- ❑ Stabilization time
- ❑ Life time
- ❑ Burning time (how long was the lamp totally burned)
- ❑ Ballast
- ❑ Frequency
- ❑ Color rendering index Ra
- ❑ Correlated color temperature Tc

When a lamp is used in a test program execution (the actual measurement of the lighting device containing this lamp), the burning time is recorded and saved into the lamp database.

Lamp stabilization concept

When a lamp is switched on (or its nominal electrical values are applied to the lamp), it does not immediately emit a constant and final luminous flux, and also intensities in any direction, luminances or illuminances at a given distance are not constant. This is usually only achieved if the lamp is under stable thermal conditions, when the lamp is stabilized.

The limes program allow the lamp not only to be switched on, but for incandescent lamps slowly ramping the voltage or the current up to the nominal or set value, which expands the life time of lamps as test lamps and keeps the photometrical values of the lamp more stable and repeatable.

Even then it requires some time until the lamp burns stable. The time can vary from 2-3 min for small incandescent lamps, about 30 min for a fluorescent tube, or several hours for a compact fluorescent lamp.

> *Note:*
> *More information about this is found for instance in the CIE Technical Report 121*
> *"Goniophotometry of lamps and luminaires".*

When a lamp is tested with the Limes software, the lamp stabilization can be performed under program control

The function of stabilization is as follows:

❑ After setting the electrical value the intensity in a certain position is measured in cycles of about one reading per second.

❑ The deviations of the readings from the first reading are calculated as a percentage value from the initial reading.

❑ These deviations are compared with a given tolerance value for a specified time (tolerance time)

❑ At the end of the tolerance time is checked if the deviations are larger than the tolerance specified.

❑ If the tolerance is exceeded, another tolerance time period is checked.

❑ If the tolerance is not exceeded, the stabilization is finished, the stabilization function can be terminated automatically

❑ The repetition of the tolerance check can be made until a specified maximum stabilization time-

❑ The measurements during the stabilizations are recorded and can be displayed later.

Lamp defined stabilization

Each lamp can have an individual stabilization characteristic, which is defined with the lamp data and saved in the lamp database

Default stabilization

If no lamp specific stabilization period is defined, default settings are used as specified in the Limes main options menu Program.

Function in Limes program

The stabilization can be executed either from the Limes main menu Hardware or during execution of a test program.

Program flow concept

The program flow is the list of steps performed during a test measurement. The program flow starts from the first step of program execution and ends when the measurement is finished completely.

The program flow consists of these steps:

- ❑ Entering test sample data description
- ❑ Ramp lamp up: slowly increase lamp voltage or current to the set value
- ❑ Lab lights off: switch the ambient light off in the photometric laboratory
- ❑ Move goniometer: control the goniometer for installation and adjustment of the test sample
- ❑ Burn-in lamp: stabilize the lamp, waiting for the photometric values of the lamps to be constant after ramping up
- ❑ Execute test functions: execute actual test measurement
- ❑ Move to mounting position: with goniophotometer measurements the goniometer moves ti the Zero position
- ❑ Ramp lamp down: slowly decrease lamp voltage or current to Zero
- ❑ … (Perform same steps if a second lamp (second filament of a lamp) is tested separately)
- ❑ Lab lights on: switch the ambient light on in the photometric laboratory
- ❑ Enter comments: add comments to the test sample data
- ❑ Save test sample data to database
- ❑ Print selected test reports
- ❑ Automatically repeat from beginning for series measurements (lots of similar samples with the same test program)

Each individual step can be switched on or off for the execution of the test program. A different standard program flow can be assigned to each test program individually, but can be modified before starting the test.

> *Note:*
> *Some of the items of the program flow list can only be performed if the corresponding hardware is connected., e.g.*

- ❑ Lamps can only ramped if a power supply is connected
- ❑ Lab lights can only be switched on or off if the lab lights control is connected to the relay output on the rear panel of the goniometer control unit

Evaluation concept

Evaluation means the analysis of test sample data measurement results. This includes printed reports or tabular and graphical presentation of results in different ways. Evaluation of data is usually made from one single data file (exception: statistics of multiple files). Sequential evaluation of multiple files with test reports printed for each file can be done easily.

Printed evaluation can be done in 3 ways:

- ❑ Automatically after measurement
- ❑ Manually started from the LIMES main file menu
- ❑ Individually after viewing the evaluation on the computer screen

Individual evaluations

These can be started from the Limes evaluation menu. There are 3types of possible evaluations:

- ❑ Tables: tabular evaluations, display of tables of figures
- ❑ Graphics: graphical evaluation, display of diagrams
- ❑ Pictures: presentation of bitmap files

Tables

The table menu shows submenus with only those tables, which can be created from the actual test data set. If the test results of the test sample file do not contain light distributions, only a limited number of tables can be shown

The content of a table can generally exported into an individual ASCII file.

Graphics

The graphics menu shows submenus with only those diagrams, which can be created from the actual test data set. If the test results of the test sample file do not contain light distributions, only a limited number of diagrams can be shown

A graphic can be saved into a bitmap file suing one of the available bitmap file formats, e.g. BMP or JPEG.

Picture view

Graphics saved as bitmap files, or any other bitmap file (digital photo, files created from other programs) can be viewed and automatically presented on the computer screen.

Configuration concept

The concept of configurations is widely used throughout the LIMES programs.

A configuration is a list of settings for an application, which is saved with an individual name into a database, usually called options.mdb.

Configurations have to be prepared once, and can easily be applied to the application by selecting the name form the list of configurations in the database.

Examples:

For display of a intensity intersection diagram a wide range of parameters can be set, such as background color, line colors, font sizes and styles, diagram size, labels and text at the diagram axis etc. When the setting is made, it can be saved with a name into the options database and applied to a graphic display of the intersection diagram at any time.

A set of test reports which shall be printed immediately after measurement can be selected. For instance a test protocol, an isolux diagram and an intersection diagram shall be printed automatically. Once it has been selected, it is saved with a certain name into the options database and can easily be selected for any test.

Printing concept

For printing of limes test reports and graphics any connected windows printer can be used.

The LMT LIMES 2000 software contains of a virtual printer, which can be used before any pages are send to the real printer.

The virtual printer allows to display the printed pages as they appear on paper into a window on the screen. The window can be enlarged or reduced with a zooming function of the virtual printer. Pages can be collected to multi-page reports with unlimited numbers of pages.

Reports can be saved as documents and can be reloaded and printed at any time.

Pages can be created with individual headers and footers. These headers and footers can be created with a word processor like MS Word and saved as so-called RTF-files.

A page can be designed with border sizes, headers, footers, and containing any bitmap, e.g. as company logos. Bitmaps can be imported in any graphic format and can be changed in position and size on the page. Page styles can be saved with a name and easily be used for any report.

Tables and other printed text can be designed with different styles and fonts.

Operator concept

The LMT LIMES 2000 software can only be operated by a user, who has been assigned to the program system with a name and a password and had been given certain user rights.

> *Note:*
> *The LIMES Translator program does not require a login.*

There are different types of users:

❑ General user

❑ Operators

The **general user** is the one who installs the LMT LIMES 2000 software and is generally responsible for the system. When the Limes software is started for the first time, no general user is assigned. The one who logs in first by entering a password, is accepted as the general user. He an then enter a name and a department to be displayed in the license information in the Limes program. Name and password can be changed any time later, when the user logs in with his general password. A general user always has 'master' rights

An **operator** is a user with a name, password, and assigned to a certain user level. Operators can be assigned by the general user or by any other operator who has 'master' rights.

User levels

The Limes software uses 3 different user levels:

❑ Master

❑ Super user

❑ User

Master

A master can perform any function with the Limes program. He can modify all settings, or modify any test programs. and assign other operators.

Super user

A super user can do anything a master can, only he cannot assign other operators. A super user can have special rights to perform certain actions, like deleting files, changing hardware settings, or creating applications, but individual rights can be disabled.

User

An ordinary user can only work with the program. He cannot change any settings, or modify any test programs.

> *Note:*
> *The general user password is never visible in the program and cannot be retrieved by the user if forgotten. Only LMT is able to decode the special user database to retrieve a forgotten user password.*
> *All other master, super user and user passwords can be read when assigning new operators or editing operators from the Limes main options menu.*

> *Note:*
> *If is recommended that after login as a general user, you should assign yourself as an operator with master rights using a different password.*

Application concept

Saving of preferences

The LMT LIMES 2000 software saves the preferences (settings, start options) in 3 different ways:

- ❑ WINDOWS registry
- ❑ Databases
- ❑ .Ini-files

All properties regarding the connected hardware like photometric instruments or power meters are saved into an special formatted ASCII-file, a file with the extension .ini. Basically the file is called Limes.ini and is found in the folder which contains all other user databases and header files.

> *Note:*
> *Although the Limes.ini file could be edited by using any text editor like Notepad, it is strongly recommended to do so. All settings in this file can influence the proper functioning of the hardware and could lead to unwanted results or even to severe problems during tests. The content of this file therefore should only be modified by using the Hardware sub menu in the Options menu of the LIMES program.*

Databases are used to hold special data like isolux or isocandela values, color areas, glare diagrams, or graphic options etc. The user can change between different databases or create new ones by using the Folders submenu of the Options menu of the LIMES program.

The WINDOWS registry finally holds generally the last settings, like window sizes, location of databases, last test files the user worked on etc. At each program start the LIMES program reads the registry settings and sets them as initial setting to the program.

> *Note:*
> *The location of the settings in the registry is in HKEY_CURRENT_USER\Software\VB and VBA Program settings\LMT LIMES 2000. If this entry is deleted from the registry, the program will start using the settings as defined by the program.*

> *Note:*
> *It is recommended to delete the whole key LMT LIMES 2000 after the LIMES 2000 software is de-installed from the computer in order to save registry space.*

Applications

In terms of the LIMES 2000 software an application is a complete system of settings as saved to the WINDOWS registry. It is possible to create more applications, practically an unlimited number of them. The reasons for doing so could be as follows:

- ❑ There are different users working with the LIMES program system. Each user wants to save is own settings, his last configurations, the information about his last files etc. With different applications the program allows the automatic selection of the application after the user logs in at program start. So each different user finds automatically his last used settings without further selections.
- ❑ There are different tasks to perform, which could require the use of different settings as well. If the hardware for example contains a goniophotometer and a integrating sphere, 2 applications could be created, which simplify the using of these instruments. One application could hold the settings for testing light distributions with the goniophotometer, and creating diagrams and tables of it, the other could have the settings for use of the sphere only.

Applications can be created by using a button in the Folders submenu of the Options menu of the LIMES program. An application is created and saved with a descriptive name in clear text, like "Mr. Smiths settings" or "Integrating sphere testing". Applications can be renamed and deleted at any time. Once more

than the one default application has been created (which always is called "LMT"), the program can switch to one of the other applications by a new submenu Applications found at the end of the Options menu of the LIMES program.

> *Note:*
> *It is required that you must have logged in with a "Master" password to change, select or create applications, or as a Super User with these rights enabled*

■ See more about application management in How to manage applications

Graphical Evaluations (Automotive Lighting)

Isoline Diagram

Light distributions which had been measured in certain angular ranges can be shown as isolux of isocandela diagrams, depending on the selected units for the iso-values.
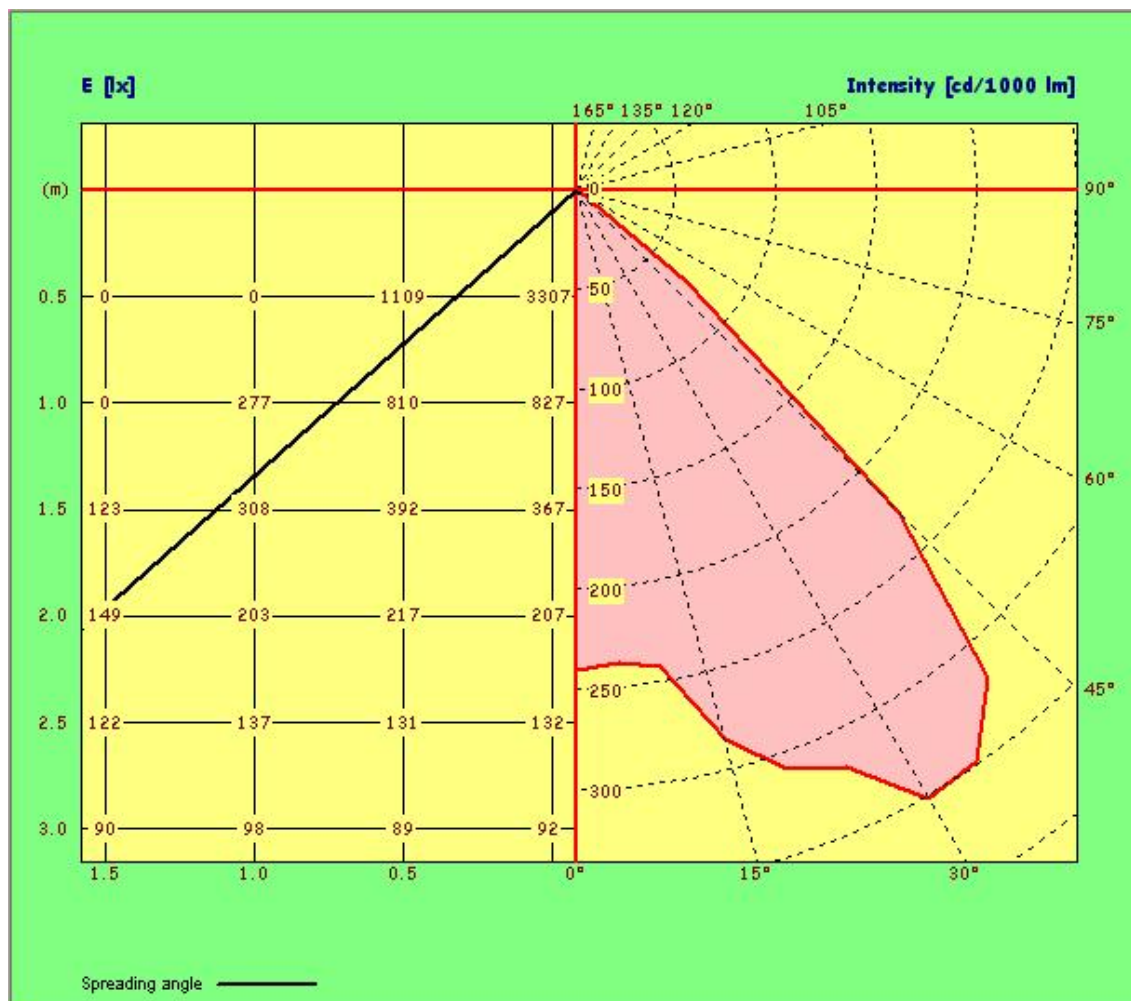
Graphical Evaluations (General Lighting)

Lux and Candela Diagram

This diagram displays a combination of 2 different parts.

- Polar diagram of the intensity distribution in the C0-plane
- Table of illuminances on horizontal planes in several distances from the luminaire

Example:

Spreading angle: The half-width angle of the intensity distribution in the C0-plane (the angle where the intensity is 50 % of the intensity at Gamma = 0°)

Test Program Functions (Automotive Lighting)

Function Point measurement

General

This function is a function of an LMT LIMES 2000 test program valid for both automotive and general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity in a certain angular direction or of an illuminance on a test screen in a certain distance from the test sample on a location defined by the angular direction

Specifics

This function allows the following special individual settings:

- Function name as display text
- Function name as printed text
- Unit
- Allow re-aiming (automotive only)
- Minimum/maximum requirements (automotive only)
- Text to display for minimum/maximum requirements (automotive only)
- Special functions minimum/maximum (automotive only)
- Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- Horizontal angular position
- Vertical angular position
- Zone no. (automotive only)

Function Horizontal line scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample on a horizontal line at a given vertical position. The horizontal line is defined by a horizontal start, stop and step angle.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular position
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Vertical line scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample on a vertical line at a given horizontal position. The horizontal line is defined by a vertical start, stop and step angle.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular position
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Horizontal scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
>
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the following order:

- ❑ Move the goniometer to the lowest vertical angle
- ❑ Perform a horizontal line scan at this vertical angle
- ❑ Move to the next vertical angle by increasing the angle with the given step angle
- ❑ Perform another horizontal line scan at this vertical angle
- ❑ Increase the vertical angle again and perform horizontal line scans until a scan at the highest vertical angle was performed

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Vertical scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the following order:

- ❑ Move the goniometer to the lowest horizontal angle
- ❑ Perform a vertical line scan at this horizontal angle
- ❑ Move to the next horizontal angle by increasing the angle with the given step angle
- ❑ Perform another vertical line scan at this horizontal angle
- ❑ Increase the horizontal angle again and perform vertical line scans until a scan at the highest horizontal angle was performed

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Maximum

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is to find the maximum of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area. The area is defined by a horizontal and vertical start and stop angles. 3 different angular resolution levels define the accuracy with which the maximum location is found, by increasing the required time for measurement with a higher resolution The measurement is done in the following order:

- ❑ Perform a horizontal scan in the defined area and compute the location of the maximum in this area
- ❑ If the second resolution level is selected, a smaller region around the location of the actual maximum is defined automatically from the program.
- ❑ Perform a horizontal scan in this defined area and compute the location of the maximum in this area
- ❑ If the third resolution level is selected, another much smaller region around the location of the actual maximum is defined automatically from the program.
- ❑ Perform a horizontal scan in this defined area and compute the location of the maximum in this area

The 3 different resolution levels are depending from the angular resolution of the goniometer.

- ❑ Goniometers with 0.01°: Levels of 0.25°, 0.05° and 0.01°
- ❑ Goniometers with 0.1°: Levels of 2.5°, 0.5° and 0.1°

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Resolution

- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function ECE Zone III (15°)

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the same order as the horizontal scan.

The difference is given only by the range of values, which are checked against the minimum or maximum requirement. Only those values are checked, which have been measured at angular positions above the cutoff line shown in the ECE regulations for automotive headlamps with a 15 deg slope either on the right hand side for right hand traffic, or on the left hand side for left hand traffic.

The default evaluation is made for right hand traffic. To perform the evaluation for left hand traffic this has to be specified in the test sample data editing process..

> *Note:*
> *This function is useful only and should be used only in test programs for automotive headlamps which shall be checked for the ECE headlamp requirements*
> *It is recommended to define the vertical start angle as a value of Zero deg.*

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function ECE Zone IV (45°)

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the same order as the horizontal scan.

The difference is given only by the range of values, which are checked against the minimum or maximum requirement. Only those values are checked, which have been measured at angular positions above the cutoff line shown in the ECE regulations for automotive headlamps with a 45 deg slope either on the right hand side for right hand traffic, or on the left hand side for left hand traffic.

The default evaluation is made for right hand traffic. To perform the evaluation for left hand traffic this has to be specified in the test sample data editing process..

> *Note:*
> *This function is useful only and should be used only in test programs for automotive headlamps which shall be checked for the ECE headlamp requirements*
> *It is recommended to define the vertical start angle as a value of Zero deg.*

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Rear Fog Zone

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in an area with a shape as defined in ECE regulations for front fog lamps . The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the same order as the horizontal scan.

> *Note:*
>
> *This function is useful only and should be used only in test programs for automotive front fog lamps which shall be checked for the ECE front fog lamp requirements*

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed

Function Retro 1000 Point

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a Retroreflex Measurement system, either RETRO 1000 or RETRO 2000, which must be available and active are required.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement the coefficient or retro reflection at a certain observation and illumination angle of a test sample.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit mcd/lx, cd/fc or cd/lx/m2
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- ❑ Horizontal angular position (illumination angle Beta2)
- ❑ Vertical angular position (illumination angle Beta1)
- ❑ Observation angle 0.2°, 0.333° or 1.5° depending on the available observation angles of the LMT RETRO 1000

Function Retro 2000 Point

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a Retroreflex Measurement system RETRO 2000, which must be available and active are required.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement the coefficient or retro reflection at a certain observation and illumination angle of a test sample.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit mcd/lx, cd/fc or cd/lx/m2
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- ❑ Horizontal angular position (illumination angle Beta2)
- ❑ Vertical angular position (illumination angle Beta1)

Observation angle between 0.1° and 2° depending on the available observation angle range of the LMT RETRO 2000

Function Color Point

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a tristimulous colorimeter, such as C1200, C1210, C2000, or C3300, which must be available and active are required.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of the chromaticity coordinates and other photometrical values of a test sample in a certain distance from the test sample on a location defined by the angular direction.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit lx or cd
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- ❑ Horizontal angular position
- ❑ Vertical angular position

> *Note:*
> *The requirements are given for the illuminance or intensity, depending on the selection. The fulfillment of color requirements can be checked as well, but has to be done by defining the color area in the general test program properties or independent by the test program during evaluation of the data.*

Function Color Vertical Scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a tristimulous colorimeter, such as C1200, C1210, C2000, or C3300, which must be available and active is required.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program. Color scans at higher speeds caon only be performed with fast colorimeters, such as C3300.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area as well as the color (chromaticity coordinates) distribution. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the following order:

- ❑ Move the goniometer to the lowest horizontal angle
- ❑ Perform a vertical line scan at this horizontal angle
- ❑ Move to the next horizontal angle by increasing the angle with the given step angle
- ❑ Perform another vertical line scan at this horizontal angle
- ❑ Increase the horizontal angle again and perform vertical line scans until a scan at the highest horizontal angle was performed

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special functions minimum/maximum
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max
- ❑ Horizontal angular measurement range
- ❑ Vertical angular measurement range
- ❑ Zone no. (automotive only)
- ❑ Save distribution
- ❑ Goniometer scan speed (Select Zero for a slow colorimeter)

> *Note:*
> *The requirements are given for the illuminance or intensity, depending on the selection. The fulfillment of color requirements can be checked as well, but has to be done by defining the color*

area in the general test program properties or independent by the test program during evaluation of the data.

Function Color Horizontal Scan

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a tristimulous colorimeter, such as C1200, C1210, C2000, or C3300, which must be available and active is required.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program. Color scans at higher speeds caon only be performed with fast colorimeters, such as C3300.*

Purpose

The purpose of this function is the measurement of an intensity distribution or of an illuminance distribution on a test screen in a certain distance from the test sample in a rectangular area as well as the color (chromaticity coordinates) distribution. The area is defined by a horizontal and vertical start, stop and step angles. The measurement is done in the following order:

❑ Move the goniometer to the lowest vertical angle

❑ Perform a horizontal line scan at this vertical angle

❑ Move to the next vertical angle by increasing the angle with the given step angle

❑ Perform another horizontal line scan at this vertical angle

❑ Increase the vertical angle again and perform horizontal line scans until a scan at the highest vertical angle was performed

Specifics

This function allows the following special individual settings:

❑ Function name as display text

❑ Function name as printed text

❑ Unit

❑ Allow re-aiming (automotive only)

❑ Minimum/maximum requirements

❑ Text to display for minimum/maximum requirements

❑ Special functions minimum/maximum

❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max

❑ Horizontal angular measurement range

❑ Vertical angular measurement range

❑ Zone no. (automotive only)

❑ Save distribution

❑ Goniometer scan speed (Select Zero for a slow colorimeter)

> *Note:*
> *The requirements are given for the illuminance or intensity, depending on the selection. The fulfillment of color requirements can be checked as well, but has to be done by defining the color*

area in the general test program properties or independent by the test program during evaluation of the data.

Function Luminance Point

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a suitable goniophotometer and a luminance meter, such as L1003, L1006, or L1009, which must be available and active are required. The luminance meter is supposed to be mounted on the goniophotometers sample mounting table in order to be rotated into different angular positions. This function is supposed to be used for license plate lamp measurements.

> *Note:*
> *Available and active goniophotometers and other devices are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of the luminance of or illuminance on the surface of a vertical plane (license plate) in a certain distance from the luminance meter on a location defined by the angular direction and the test distance.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit lx or cd/m2
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- ❑ Horizontal angular position
- ❑ Vertical angular position

> *Note:*
> *The angular positions of the goniophotometer are not entered in this function. The position of the luminance meters measuring field on the measuring plane(license plate) are given instead. The program calculates the goniophotometers angles at execution time of the program depending from the actual test distance.*

Function Gradient

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a certain number of Luminance Point functions must be available in the test program

Purpose

This function is not a measurement function. It calculates the gradient of the luminances between 2 measurement points (Luminance Points) by using the formula as defined in the ECE regulation for license plate lamps. The gradient there is the difference of the luminances of any 2 points out of all test points divided by the distance between these points in cm.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)

Function Uniform

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

To enable the use of this function a certain number of Luminance Point functions must be available in the test program

Purpose

This function is not a measurement function. It calculates the uniformity of the luminance distribution given by the measurement points (Luminance Points) by using the formula as defined in the SAE regulation for license plate lamps. The uniformity there is the ratio of the highest measured luminance to the lowest out of all test points.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Minimum/maximum requirements
- ❑ Text to display for minimum/maximum requirements
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)

Function Text line

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

Purpose

This is not a measurement function. The purpose of this function is only to insert a function line in a test protocol of the test program, which can contain a text as a comment or shall be used as a separator line (e.g. between low beam and high beam measurement functions).

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text

Function Pause

General

This function is a function of an LMT LIMES 2000 test program valid for automotive lighting.

Purpose

This is not a measurement function. The purpose of this function is only to allow a break during measurement, when all functions defined before the pause function have been measured. The Limes program stops the test program execution and displays a message. The user has to confirm to continue by clicking on a button on the window of this message.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text

Test Program Functions (General Lighting)

Function Point measurement

General

This function is a function of an LMT LIMES 2000 test program valid for both automotive and general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity in a certain angular direction or of an illuminance on a test screen in a certain distance from the test sample on a location defined by the angular direction

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Allow re-aiming (automotive only)
- ❑ Minimum/maximum requirements (automotive only)

- ❑ Text to display for minimum/maximum requirements (automotive only)
- ❑ Special functions minimum/maximum (automotive only)
- ❑ Special requirements F1min, F2min, F3min, F1max, F2max, F3max (automotive only)
- ❑ Horizontal angular position
- ❑ Vertical angular position
- ❑ Zone no. (automotive only)

Function Single Cone measurement

General

This function is a function of an LMT LIMES 2000 test program valid for general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution on a single cone (all C-planes at a fixed angle gamma) at a given angle gamma position. The single cone is defined by a start, stop and step angle.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ C-plane measurement range
- ❑ Angle gamma position
- ❑ Goniometer scan speed

Function Single C-Plane measurement

General

This function is a function of an LMT LIMES 2000 test program valid for general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution of a single C-plane at a given angle C-position. The single C-plane is defined by a start, stop and step angle.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Angle Gamma measurement position
- ❑ C-plane measurement range
- ❑ Goniometer scan speed

Function Cone measurement

General

This function is a function of an LMT LIMES 2000 test program valid for general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution of a various C-planes in a given angle Gamma range. The measurement range is defined by start, stop and step angles C and Gamma.

The measurement is performed by moving the goniophotometer to the lowest gamma value and then scanning of all values in the defined C-plane range, then continue with the next angle gamma and measure the next cone until all cones are measured.

> *Note:*
> *If this function is used with goniophotometers which allow continuously rotating of the test samples, the rotation is not stopped when a cone scan is finished. (e.g. on goniophotometers with rotating mirror GO-DS 1600/2000 or Flux Integrators GO-FI 2000)*

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Angle Gamma measurement range
- ❑ C-plane measurement range
- ❑ Goniometer scan speed

Function C-Plane measurement

General

This function is a function of an LMT LIMES 2000 test program valid for general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution of a various C-planes in a given angle Gamma range. The measurement range is defined by start, stop and step angles C and Gamma.

The measurement is performed by moving the goniophotometer to the lowest C-plane and then scanning of all values in the defined angle gamma range, then continue with the next C-plane until all planes are measured.

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Angle Gamma measurement range
- ❑ C-plane measurement range
- ❑ Goniometer scan speed

Function Integration

General

This function is a function of an LMT LIMES 2000 test program valid for general lighting.

To enable the use of this function a suitable goniophotometer which must be available and active is required.

> *Note:*
> *Available and active goniophotometers are defined in the hardware options of the Limes program.*

Purpose

The purpose of this function is the measurement of an intensity distribution of all C-planes in a given angle Gamma range. The measurement range is defined by start, stop and step angles Gamma. This function is designed to integrate the luminous flux in the given angular range, and uses the special luminous flux integration routine of the LMT LIMES 2000 software.

The measurement is performed by moving the goniophotometer to the lowest angle gamma and then scanning of all values in the defined angle gamma range until the whole light distribution in this range is measured.

> *Note:*
> *The special luminous flux integration routine used in this function gives a higher accuracy of integrated luminous flux when the total number of measured values in this function increases. As this is dependent basically on the total measurement time used for this function, it is recommended to select the highest possible rotation speed (e.g.7) and the lowest possible scan speed (e.g. 1, but for practical reasons 3)*

Specifics

This function allows the following special individual settings:

- ❑ Function name as display text
- ❑ Function name as printed text
- ❑ Unit
- ❑ Angle Gamma measurement range
- ❑ C-plane measurement range
- ❑ Goniometer scan speed
- ❑ Goniometer rotation speed
- ❑ **This function does not save the measured light distribution as a table of individual values**

Photometric Principles

Principle of luminous flux integration

Principle

The luminous flux Φ of a light source is defined as

$$\Phi = \int_{A_2} E \mathrm{d}A_2$$

With

A_2 an enveloping surface enclosing the light source (Envelope)

E Illuminance on the area element $\mathrm{d}A_2$.

The measurement of an illuminance distribution is sufficient for the correct integration of the luminous flux, if the measurement has been done within the so-called photometric limit distance (e.g. also for large light sources) and with arbitrary position of the light source in the goniophotometer (but inside the envelope), if the used photometer head evaluates the light according to the cosine of the angle of incidence correct within the possible angular range.

Theory:

If (r, ϑ, φ) are the polar coordinates of a coordinate system connected to the goniophotometer $(0 \le \vartheta \le \pi, \ 0 \le \varphi \le 2\pi)$, the enveloping surface (virtual sphere, radius r) can be devided into m zones $m \ge 60$ of equal width $\Delta\vartheta = \pi/m$. With $\vartheta_i = i \cdot \Delta\vartheta$ the integral in the above formula can be replaced for evaluation of the luminous flux by:

$$\Phi = 2\pi r^2 \sum_{i=1}^{m} \overline{E}_i \left[\cos \vartheta_{i-1} - \cos \vartheta_i \right]$$

With:

Φ Luminous flux

r Radius of goniophotometer

$\overline{E}_i$ Mean value of illuminance of zone *I*

ϑ_i Angle to bottom border of zone *i*

Integrating sphere measurement

The LIMES program can be used for measurement with integrating spheres like

- ❑ **UL 1000**
- ❑ **UL 1500**
- ❑ **UL 2000**

The spheres can be equipped with a tristimulous colorimeter for flux and color measurement at the same time.

To allow integrating sphere measurement the necessary hardware module must be available in the software.

Integrating sphere measurements can be executed by using the Integrating Sphere or Luminous Flux menu of the LIMES main menu item Hardware.

> *Note:*
> *If no goniophotometers are defined in the system, integrating sphere measurements can also be started by the Execute program menu or icon of the LIMES main toolbar.*

Procedure

Luminous flux measurement with an integrating sphere is always a relative measurement. This is done by comparison of the measured flux of the test lamp with the measured flux of a standard lamp, which has a known luminous flux certified by some calibration protocol. Luminous flux standard lamps are usually measured by other devices such as goniophotometers, and can be obtained from lamp manufacturers or test houses.

As stated in the relevant document CIE Publication No. 70 "The Measurement of Luminous Flux" the following measurements have to be done

- ❑ Measurement of test lamp flux
- ❑ Measurement of standard lamp flux
- ❑ Measurement of auxiliary lamp with test lamp
- ❑ Measurement of auxiliary lamp with standard lamp

With the LIMES software it is possible to reduce the number or standard lamp measurements, which usually are to be done any time a test lamp is measured, by measuring the standard lamp only once and then simply reloading the standard lamp from the lamp database before doing a measurement on a test lamp. This can be done safely for a longer period. The standard lamp measurement has to be repeated only to keep control of changing effects in the sphere (ageing of inner sphere paint etc.).

The LIMES software also saves the auxiliary lamp measurements, therefore also these measurements with the standard lamp can be used by reloading from the database.

Specifics

The luminous flux measurement with integrating spheres by the LIMES program has the following features:

- ❑ Saving lamp data into the lamp database and making the luminous flux values available for other applications like goniophotometer measurements on luminaires, automotive headlamps, or signal lamps
- ❑ Possibility of recording the luminous flux of the lamp over a long time for checking lamp stability
- ❑ Possibility of recording luminous flux values as a function of temperature over long time
- ❑ Possibility to set the luminous flux of DC operated lamps to a certain value

Setting luminous flux

The setting of luminous flux is performed as follows:

- ❑ Set the lamp to an upper voltage value and measure the luminous flux after a settle time
- ❑ Set the lamp to an lower voltage value and measure the luminous flux after a settle time
- ❑ Calculate the voltage for the desired luminous flux by using the known exponential relation between lamp voltage and luminous flux for incandescent lamps
- ❑ Set the calculated voltage and measure the luminous flux after a settle time
- ❑ Decrease or increase the voltage, if necessary, by certain voltage increments, wait for a certain adjust time, and read the luminous flux
- ❑ Proceed as before, until the flux deviation between the measured and the desired flux is less then the specified flux tolerance, or until the maximum number of trials have been performed

Observe the following rules:

- ❑ Use a maximum voltage (upper voltage limit) that does not harm the lamp
- ❑ Use a minimum voltage which gives a flux less than the desired flux
- ❑ Use reasonable settle and adjust time, depending on the size of filament (lamp power)
- ❑ Allow a reasonable tolerance for the flux. Think of lamp stability.
- ❑ If you do not have success at the first time, modify the values. Set upper and lower voltages manually, note the fluxes, and try again.

Measurement of cutoff

Cutoff-line measurement and visual aiming

In automotive lighting the cutoff of a headlamp defines the border between bright and dark, if the headlamp illuminates a test screen in front of the automobile where the headlamp is installed. The cutoff is used for visual aiming of the headlamp, and to avoid glare at opposite traffic. For an ECE type headlamp the cutoff should be at a position of 100 mm below the horizontal on a test screen in 10 m distance, which gives a vertical angle of –0.57 deg.

The cutoff line can be estimated by photometrical measurement. For this a vertical scan is performed, so that the scan covers the intensity in the bright area as well as the dark area. Typically a scan is done from –1 deg to 0 deg at a certain horizontal position. This position should be anywhere in the horizontal part of the cutoff, but often is only set at one value, for ECE typically at –2 deg (2 deg left),

From the measured illuminances (or intensities) of the vertical scan the gradient is calculated. Several definitions exist. The Limes program uses the Schmidt-Clausen formula:

- ❑ Difference of the logarithm of 2 illuminances measured at an angular difference of 0.1 deg, divided by the angular difference.

It is recommended the scan measurements are done at a much smaller step, preferably every 0.01 deg. Still 2 values with the distance of 0.1 deg are taken from the list to compute the gradient function (gradient as function of the vertical angle)

The location of the maximum of this function is defined as the cutoff position. The sharpness of a cutoff is defined as the maximum value of the gradient function. A good cutoff should produce only one maximum.

A secondary (or a third or fourth and so on) maximum appears at a so-called double cutoff line. In this case the gradient function has more than one maximum, clearly separated from the first. Requirements can be given that any other maximum appearing should have a value less than a certain percentage of the first.

Stability of cutoff-line

The cutoff-line measurement can also be used to measure the stability of the cutoff-line of an automotive headlamp due to heating up the mechanical components of the headlamp during burning of the lamp. According to the regulations the cutoff-line shall not change more than a given value, in ECE regulation this is given for max. 1 mrad.

> *Note:*
> *1 mrad is identical to an angular deviation of 0.057 deg*

The deviation usually is measured by the following procedure:

- ❑ Switching the lamp on
- ❑ Waiting 1 min
- ❑ Measure the position of the cutoff-line
- ❑ Waiting 29 min
- ❑ Measure the position of the cutoff-line again
- ❑ Calculating the difference of the two measured positions in mrad

As it is possible to define a cutoff measurement as one or more vertical scans at any horizontal position, this function can be customized as required.

The LIMES program also allows to increase the number of measurements, and to change the waiting periods as required.

For stability of cutoff-line according to a regulation a proper setting has to be defined by the user prior to the measurement, using the visual aiming editor of the LIMES program.

Correction of C-planes

In general lighting photometry light distributions are usually done in the C-plane system. Independing of the measurement procedure, either at measurements of all individual planes one after another or at measurement of all intensities for each angle C at a constant angle Gamma (usually known as cone-surface measurement), measurements maybe taken at the angles Gamma = 0° and Gamma = 180° in each plane at a different time. Due to the instability of the test samples lamp or the photometer, differences between the measured intensities can occur. As these intensities theoretically must be identical for either Gamma = 0° or Gamma = 180°, a correction of the intensities can be performed by the LIMES program.

The correction influences the whole light distribution, of course also all derived quantities, like zonal fluxes, light output ratio etc.

For the correction all intensity values in a plane are multiplied by a factor, which is derived from the different intensities at the same angle Gamma.

The correction can be done in 2 different ways:

- ❑ Correction for average
- ❑ Correction for maximum

It might be a possibility, that a correction is not useful. This may be in the case, when the intensity values are relatively small compared to the maximum, or if the correction factors appear to be very high.

Example:

A downlight with a very small intensity upwards was measured. The maximum intensity is about 500 cd/klm, the intensities measured at Gamma = 180° are between 0.5 and 1.5 cd/klm.

Even if the relative deviations in this case are about 300%, a correction is not done.

Correction for average

All values at angles Gamma = 0° or at Gamma = 180° of all planes measured are taken, and the average of these values is estimated. The correction factor for all intensities at all angles Gamma in any plane is calculated from the relation of the individual value at Gamma = 0° or at Gamma = 180° and the average value.

This correction method is preferred to correct for instabilities of lamps or photometers, when the burning position of the lamp is not changed at each individual reading.

Correction for maximum

All values at angles Gamma = 0° or at Gamma = 180° of all planes measured are taken, and the maximum of these values is estimated. The correction factor for all intensities at all angles Gamma in any plane is calculated from the relation of the individual value at Gamma = 0° or at Gamma = 180° and the maximum value.

This correction method is preferred to correct for deviations of measurements due to changing of the emitted luminous flux of the lamp under test, when the burning position of the lamp is changed at each individual reading.

User settings

The user can influence the correction procedure by selecting the method and setting the correction conditions.

Method selection

The user selects the method either during input of the test sample data or during evaluation.
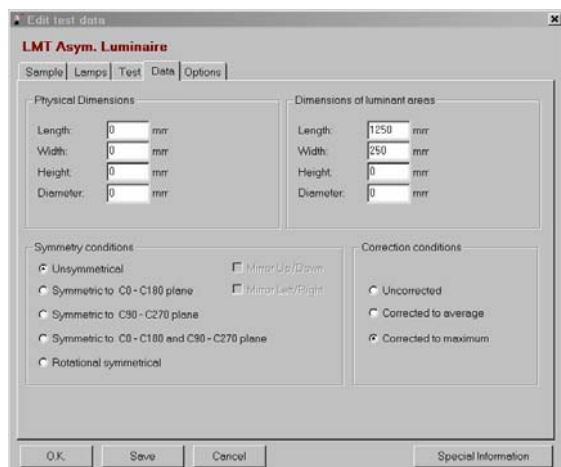
Figure: Method selection during test sample editing
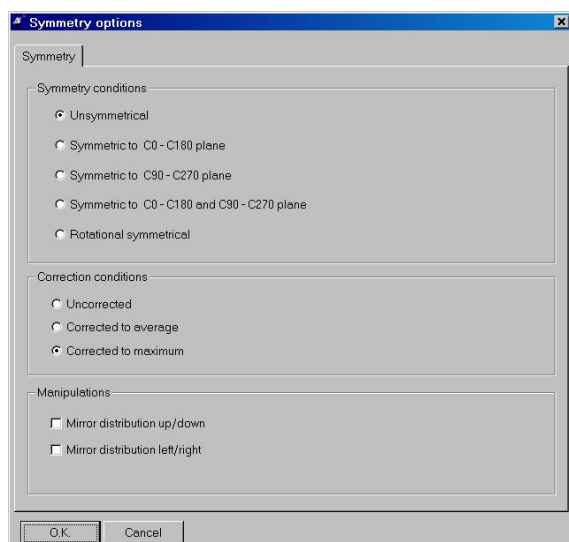
Figure: Method selection during evaluation

Correction conditions

The user can set the correction conditions in the LIMES Options menu / Program menu on the page Program:
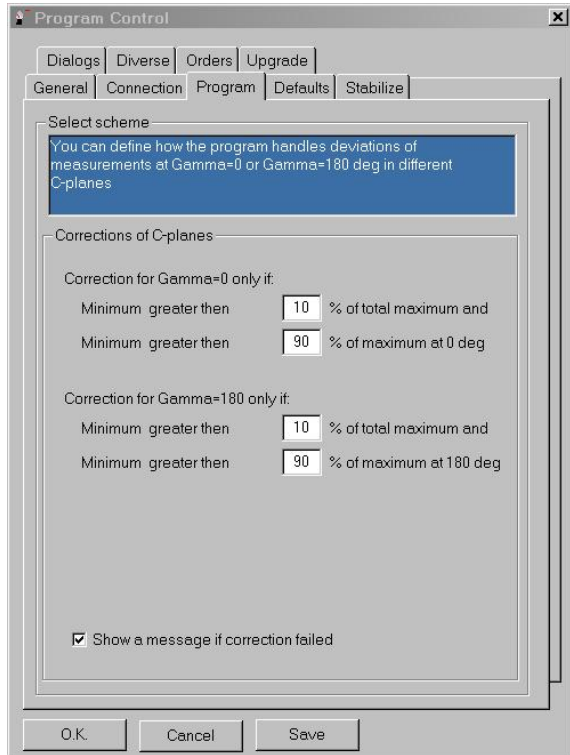
Figure: User setting of correction conditions

A correction is only made, if the intensities match the requirements entered by the user. Otherwise the correction is not performed, an a message is displayed.
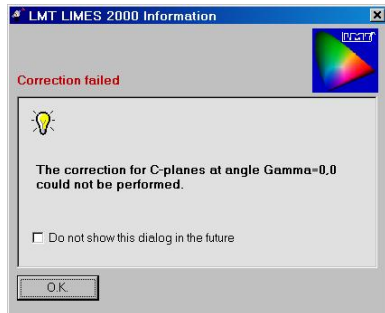
Figure: Correction failed message

The user can avoid the presentation of the message by clicking on the check mark "Do not show this dialog in the future".

Correction results

In the examples a not corrected and a corrected light distribution is shown, presented in the polar diagram.
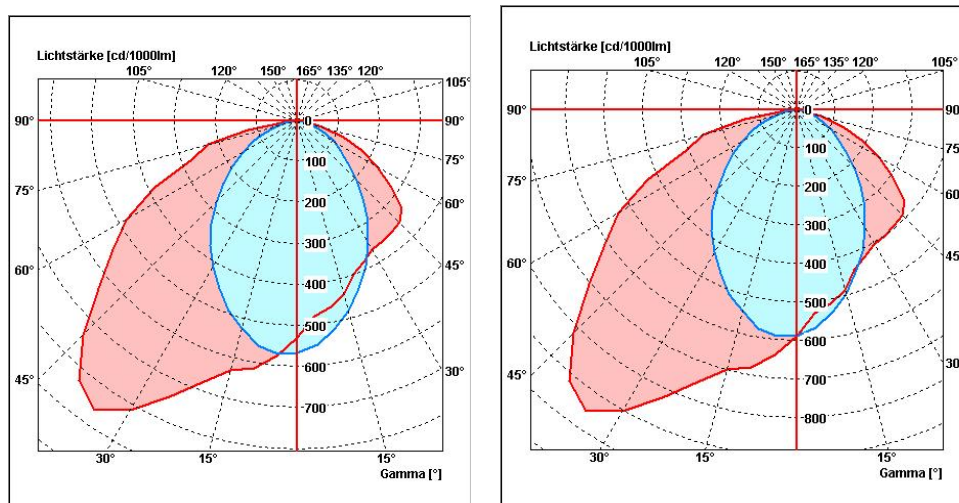
Figure: Polar diagrams for uncorrected and corrected light distributions

How to ...

Perform an automatic test

This are the steps which are necessary to run an automatic test on a new test sample.

Note:
We assume that the system was installed properly, all required instruments (goniophotometer, photometers, power supplies etc.) are connected and running, and the test program is available in the test program database.

Steps to perform:

❑ Start LMT LIMES 2000 program. LimesControl is started as well and connected to the PC which runs the Limes program

❑ Login if required

❑ Select Edit test sample data from main menu

❑ Enter the necessary information for the test sample, select the lamps, test conditions, and any required data.

❑ Select Load test program from main menu

❑ Select the test program from the database and use it with the test sample data.

❑ Start Execute from main menu or tool bar

❑ Click the start button on the execute windows tool bar

❑ Wait until the test is finished, the data is saved and the selected reports have been printed.

❑ End the LMT LIMES 2000 programs by selecting Exit from the Limes main menu or by clicking the Exit button on the Limes tool bar

How to test signals in flashing mode

Several regulations for signal lamps allow or require the measurement in flashing (blinking) mode, to avoid overheating of the devices especially when they are equipped with LEDs, e.g. in direction indicator (turn signal) lamps. This document describes the procedures of the LMT LIMES 2000 software which are available to perform this function.

With the LIMES software the flashing is not done by a separate relay, but on a time dependent switching of the supply voltage under software control.

Enabling the flashing mode during measurement
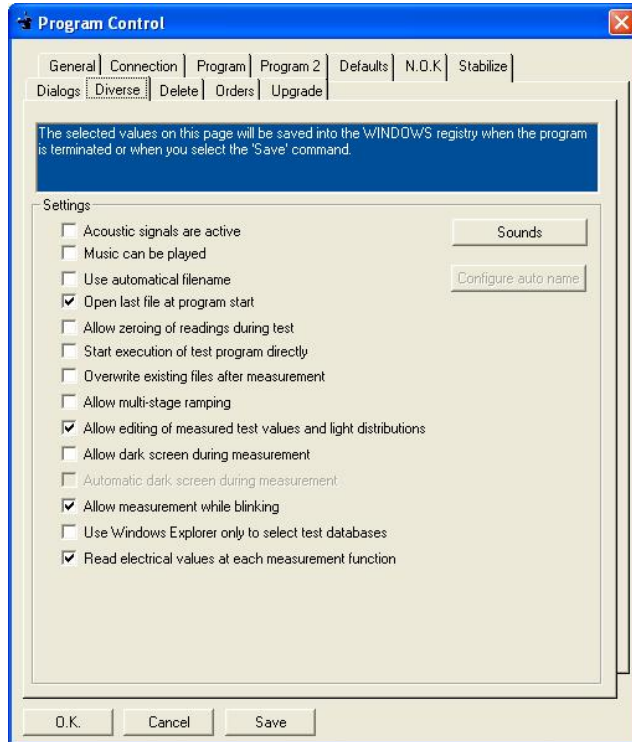
You have to set a flag in the general program options "Allow measurement while blinking". This option is saved and available for all future measurements.

Preparation of the test program
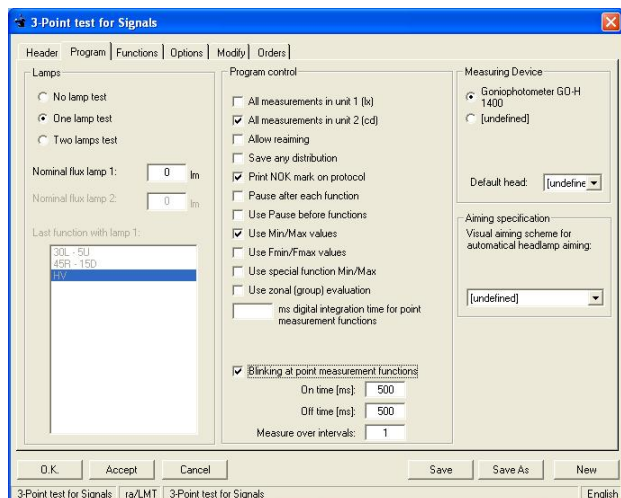
You have to set a flag for "Blinking at point measurement functions". After this you enter the on and off times for each flash, and how many flashes (intervals) shall be measured.

This setting can be saved with the test program into the program database and can be used for all future tests with this program.

Preparation of the test sample data

When entering the data for the sample to be tested, you will select the test program which describes the functions which will be tested. The pre-set settings for measurement in flashing mode are automatically taken for the test sample, but may be turned on and off or modified if required.

In the above example 3 intervals are tested, with the on and off times of 500 ms each there will be a total measurement time of 3.000 ms for each measurement function.

As the LIMES software performs about 100 readings per second in this flashing mode, about 300 individual intensity values will be collected. If "Save all data of blinking functions" is enabled, these 300 intensities will later be saved at each point into the database. From these values it is possible to produce a graphic display and print a diagram for each test point. If this flag is not enabled, only the minimum and maximum values are derived and saved.

Execution of measurement
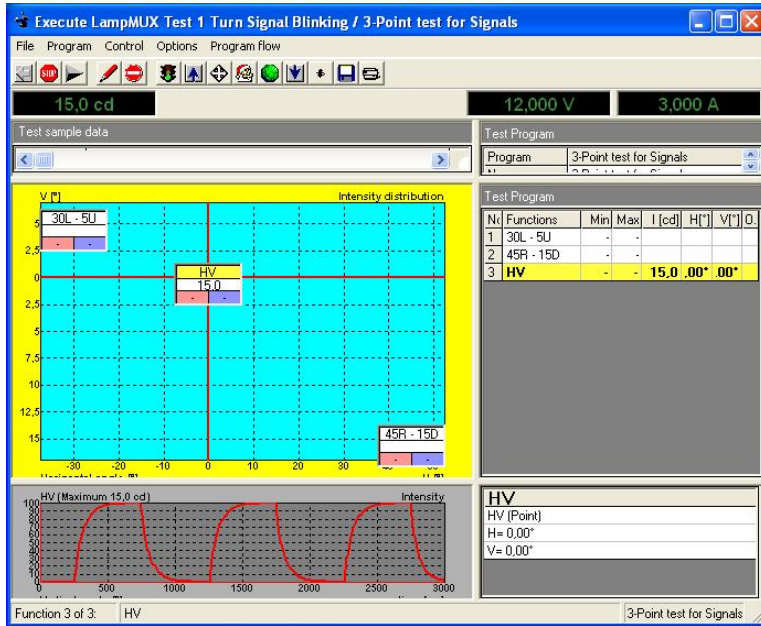
The example shows the execution of a test at three positions: 30L - 5U, 45R – 15D, and HV. Here HV has just bee tested. The results are displayed in the diagram and in the table of the right hand side. The time function of the flash is shown on the left side at the bottom of the window.

During testing the test sample is flashing under control of the LIMES software. The LimesControl software which displays the actual readings shows the flashing mode by a flashing symbol on the image of the power supply (here FUG NTN 65V/10A DC power supply)

Evaluation of test sample data after measurement

When the measurement is finished, the test sample data can be evaluated (displayed on the computer monitor or printed as report or graphics, or exported into JPEG or BMP file or EXCEL data sheet).

An example for the program grid is shown below:
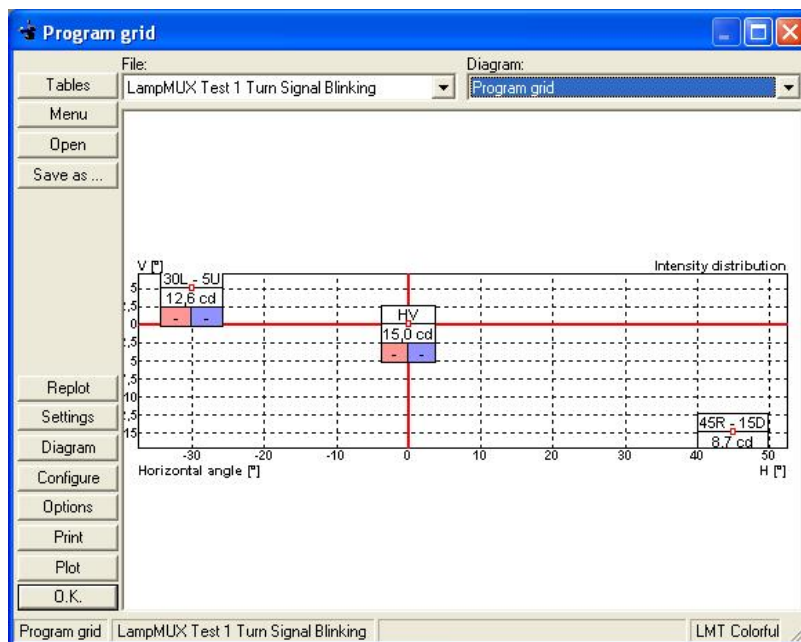
For each test point the time function of the flash can be evaluated as well:

Test headlamp cleaning

These are the steps which are necessary to run a test for headlamp cleaning devices according to ECE R45.

> *Note:*
> *We assume that the system was installed properly, all required instruments (goniophotometer, photometers, power supplies etc.) are connected and running, and the test program is available in the test program database. Test sample data and test program data are empty (no files have been loaded or existing information has been cleared by using the New menu in the file and program menus.*

Steps to perform:

❑ Start LMT LIMES 2000 program. LimesControl is started as well and connected to the PC which runs the Limes program

❑ Edit test sample data. Enter the data of the headlamp and select "Headlamp cleaning" for the type of sample. Load the bulb data from the lamp database

❑ Load a test program according to ECER45 from the program database

❑ Start the program execution

❑ Select "Initial test" from the pull down menu and run the test. Save the results into the database

❑ Apply the standard dirt to the headlamp surface

❑ Start the program execution again

❑ Select "Dirty test" from the pull down menu and run the test. Repeat the test until the results are in the required value range. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Clean the headlamp by using the headlamp cleaning device

❑ Start the program execution again

❑ Select "Clean test" from the pull down menu and run the test. Repeat the test until the results are in the required value range. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Clean the headlamp completely as it was before the initial test

❑ Start the program execution again

❑ Select "Final test" from the pull down menu and run the test. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Print the report

Edit sample data:

> *Note:*
> *You can select this type of sample only if you have not loaded any test program, which was written to save any distribution (scan) measured with this program*

It is also possible to use for individual files, which can be saved with individual names into the database, for headlamp cleaning evaluation.

Load test program:

Open your program database and select a proper ECER45 test program. If you try to load a test program which was written to save any distribution (scan) measured with this program, you get the following message:

Execute test program:

For ECER45 headlamp cleaning devices you have to perform 4 tests on the same headlamp:

- ❑ Initial test
- ❑ Dirty test

❑ Clean test

❑ Final test

All tests have to be made with the headlamp adjusted to the exactly same position. You have to use the same bulb running on the same electrical values. If you have to dismount the headlamp for applying the standard dirt or for operating the headlamp cleaning device, make sure that the next test uses the exactly same conditions as the initial test.

You can select the test (initial, dirty, clean, or final) either from the pull down menu or from the pull down box, which appears in the right hand corner of the status bar on the bottom of the screen. Both choices have the same effect.

> *Note:*
> *The menu right to the file menu and the field on the right side of the status bar appear only, if you test sample is of type "Headlamp cleaning"*

It is recommended to turn or report printing for the first 3 tests in the Program flow settings, as the report will be not complete. It is not necessary but recommended to save the data after test. After saving the first initial test each consequent attempts to save require the clicking on the Overwrite button.

Do not change the name of the test sample, always use the same file for the 4 individual tests.

You can perform the 4 tests completely independent, even on different days. Just open the file from the database, which contains one or more parts of the test, and proceed as described above.

When you start the program execution, after your test sample data contains already measured initial test, you will be asked to delete test results before execution:

Always click on the No button, otherwise your previous measured data is lost.

Do not delete the results by using the program execution options menu, as this also will delte all former tests.

> *Note:*
> *If you have saved former tests into the database, you can cancel execution and reload the data, if you happened to delete the results accidentally*

If the message above does not appear, when you have loaded test data which contain results before program execution, enable this message again using the main menus Options / Program / Dialogs.

Show results:

Select "Headlamp cleaning" from the Evaluation menu.

	Initial test	After dirt	Dirty	After cleaning	Cleaned	Final test
Functions			% … 20%		80%	
HV	4,575	4,617	100,9	4,618	100,8	4,582
50R	4,591	4,600	100,2	4,643	100,5	4,617
50V	4,595	4,572	99,5	4,626	100,4	4,607

Change headlamp cleaning parameters:

Use the Options button of the Show tables for headlamp cleaning window.

You can modify the percentages displayed in this window. These values have been saved in your Windows registry. If you modify these values, the modifications are valid as long as you run this program. To be able to use the modifications in the future, click on "Save as default". To reload default values after making changes, click on "Load default".

Change headlamp cleaning files:

You can use individual test files which have been created without the setting "Type of sample is Headlamp cleaning". You can assign individual files to the 4 test functions of the headlamp cleaning test:

> *Note:*
> *You cannot select individual files if you active test data is of type "Headlamp cleaning" as shown in this window*

Print test report:

After the final test you are ready to print the report. Select "Headlamp cleaning" from the report list. If you have the preview option on, you will see a similar page:

The table in this page contains all results of the headlamp cleaning test:

Headlamp cleaning ECER45 Test

	Initial test	After dirt	Dirty	After cleaning	Cleaned	Final test
Functions			15% ... 20%		80%	
HV	4,575	4,617	100,9	4,618	100,8	4,582
50R	4,591	4,600	100,2	4,643	100,5	4,617
50V	4,595	4,572	99,5	4,626	100,4	4,607

If the results in the column "After cleaning" are not higher than the required values (80 % of the final test in the example table above), the "Not OK"-marking will apply.

How to manage applications

To create, change name, or select an application requires that you have logged in with a 'Master' password or as a SuperUser with enabled rights to perform application operations..

Purpose of applications

Applications contain individual settings for the LIMES software. For each application a new entry in the Windows registry is created. Different applications can use

- ❑ Different system files and folders
- ❑ Different test data, program, lamp, or other databases
- ❑ Different hardware configurations
- ❑ Different operating languages

It is useful to create and use a new application when you want to optimize your system in the following examples:

- ❑ You have more than one operator working with the software. You want to allow each operator to use his individual settings, to use his own databases, to save his own last used files, to use his own graphical and tabular settings
- ❑ You have different measurement setups. Maybe you have 2 different goniophotometers, or you want to use the software for a special measurement setup. You have an integrating sphere in the system, but you want to operate the sphere only without seeing the other devices

Note:
If you have more than one application installed, and an operator which is logged in as a simple user, he cannot change the actual application. The application he will be working on is automatically selected after logon

Create a new application
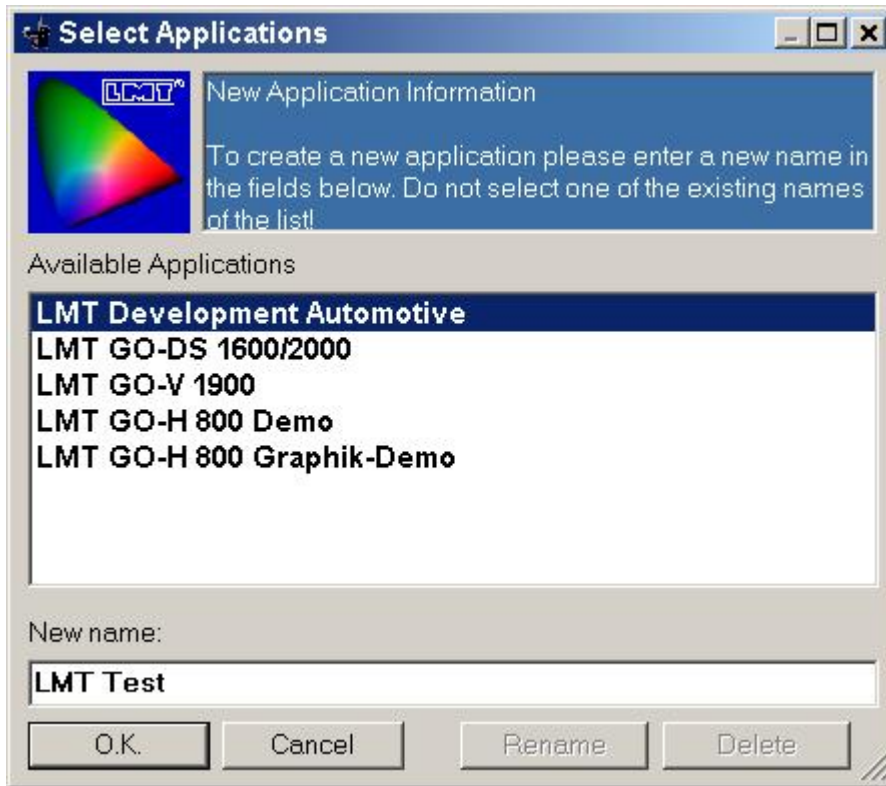
- ❑ Select the Folders submenu from the Options menu of the LIMES program.
- ❑ Click on the button 'New Application'
- ❑ The application management window appears
- ❑ Enter a name for the application in the name field (the name must be different from all other names used for any other existing application)
- ❑ Press the O.K. button.
- ❑ The new application is created and is automatically in use.
- ❑ Change all the settings you want to use for this application, or do it any later time. When the LIMES program is terminated, it will save all settings for the new applications. The settings of the application which was in use before is not changed

Rename an existing application

- ❑ Open the application management like described for a new application, or
- ❑ Select the Application submenu from the Options menu of the LIMES program

❑ Click on the Application name in the list of available applications you want to change

❑ Enter a new name into the name field (the name must be different from all other names used for any other existing application)

❑ Press the O.K. button.

Note:
You can also rename the default application 'LMT'

Delete an existing application

❑ Open the application management like described for a new application, or

❑ Select the Application submenu from the Options menu of the LIMES program

❑ Click on the Application name in the list of available applications you want to delete

❑ Click on the Delete button

❑ Press the O.K. button.

Note:
You cannot delete the default application (usually 'LMT')

Switch to another existing application
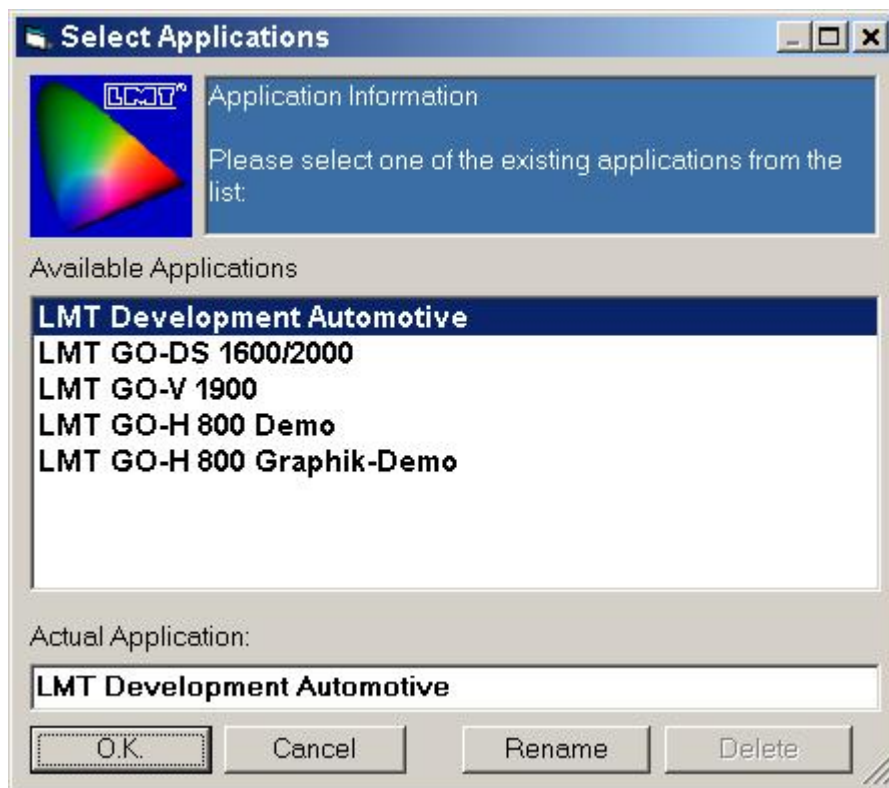
❑ Select the Application submenu from the Options menu of the LIMES program

❑ Click on the Application name in the list of available applications you want to switch to

❑ Press the O.K. button.

Note:
In the Select application menu you cannot delete the actual running application

Use LMT LIMES Translator

Installation

Insert the CD. The setup program will start automatically. Follow the instructions

First start

Start the program from the start menu (program files/lmt/lLimes translator program)

Select the destination language (e.g. Francais)

You can change the size of the main window if you like.

The database opened at first start is called TranslateItems.mdb and is located in the path \program files\lmt\limes2000. It is used for this translation program. You can work on this first if you like.

The main database is located on \program files\lmt\limes2000\data and is called Items.mbd. Select this from the file menu and open it.

If you make any changes in the text, do not forget to save before terminating.

Next start

At any later start the program continues where you finished last time, e.g. by opening the last database you worked on.

There are 3 main areas for translating, which you get from the options menu:

- ❑ Screen text
- ❑ Form names
- ❑ Info text

You may work on each area as you like.

Editing Text

The list on the upper part of the form shows the text to be translated (Destination), the list on the lower part the original text (Source).

Any text which has not yet been translated, is shown with a "~" character.

You can choose in the options, whether the list are sorted alphabetically after the source or the destination lists.

To select a text to be edited, click either on the source of destination text list.

The text appears in the Translate text field.

Any modifications you make in this field, are saved into the database when you either press the Return key or the Arrow keys up or down. The modified text appears in the destination list.

Pressing the Escape key takes the text from the source list into the translate text field.

When your session is finished, and you have made modifications, you should save the text into the database.

When your session is finished, and you have made modifications but terminate the program without saving, you are asked if you want to save your changes.

When you save your changes, the modifications are written permanently into the database. If you deny, your changes are lost.

Editing info text

Info text contains of 2 parts, the name list on the left, and the info text on the right. You change the name list first, then enter the text of the information at the right window.

The info text can contain longer phrases, or even several sentences. You can use the return key to perform line feeds, and blank spaces to indent text (no TABs).

Whenever a sequence like "%%1" is shown in the source, the translated text must also contain this sequence. It will be later replaced with variables in the LIMES program.

Search and Replace

You can search for text by typing letters into the Search text field and press the function key F3 on your key board. The text is searched in the destination fields only.

If you search in an info text, you have to click either into the left or the right window to select the search area.

The selected search area appears in slightly yellow color.

More searches and replace can be made by clicking the Search button beneath the search text. A Finding and Replace window opens, and you can also enter the search text here.

To hide this window, click the Cancel button.

You can continue searching with the F3 key.

To replace text, click onto the Replace button and enter the New text in the replace text field.

Replace the text in the selected area by more clicks on the replace button, or close the Finding and Replace window by clicking Cancel, and the press F3 to continue replacing.

You can select whether you want to search or replace full words or whether you want to ignore or take care of upper and lower case letters.

Note:
Detailed information is shown in the Translator section of this documentation

Appendix

Appendix

This appendix contains special information about

- ❑ LIMES Database format
- ❑ LIMES ASCII file format

Database Format

LMT LIMES 2000 databases are compatible to Microsoft ACCESS databases and have the file extension .mdb. Databases are constructed of a number of tables, identified by a unique name. Each table contains a number of fields, also identified by a unique name. The names have been chosen to represent the meaning and content and to understand the content more easily.

Databases are used for the following purposes:

- ❑ Test data, test programs and lamps
- ❑ Lamps
- ❑ Options
- ❑ Iso-value systems
- ❑ Auto systems
- ❑ Road systems
- ❑ Cutoff systems
- ❑ Glare diagram systems
- ❑ Color area systems

Test data database format

A test data file (set of test data) in a test database contains information about

- ❑ Test sample properties
- ❑ Test program
- ❑ Test lamps

A test program and any test lamps has individual properties. As outside the database a test data file is usually referred to by its name, inside the database it is always referred by a unique identifier (Field TestID), which is a long number in the range of 1 to about 23.000.000.000. The test identifier (test ID) is created by the database itself. Test programs and test lamps are also identified by a program identifier (program ID, field ProgID) or a lamp identifier (lamp ID, field LampID).

While the test sample properties are unique for each test data file, different test data files could have been created by using the same test program or using the same lamps. To avoid multiple saving of test programs or test lamps with the same properties, test data files refer to a test program by using the program ID or to test lamps by using the lamp ID.

The information about test data, test programs and test lamps is not only saved into one single table.

The light distribution table is saved in a separate data file located in a write protected directory (folder) which is named after the name of the database file with a leading (~) sign.

- ❑ Example: database "Limes.mdb" folder "~Limes"

This folder must be located in the same folder as the database file itself.

To reconstruct a test data file from the test database, the following procedure is used.

- ❑ Select a test data file in the table TestData by its Test ID and read all fields.
- ❑ Read all fields in table Programs where Programs.ProgID = TestData.ProgID and add them as the program header
- ❑ Read all fields of the table Functions where Functions.ProgID = Programs.ProgID, ordered by the field ListOrderNr
- ❑ Find the table where its name Table.Name = Function.Name
- ❑ Read each fields in this table where Table.ProgID = Programs.ProgID and Table.OrderNo = Functions.ListOrderNr. and add each of them as a new program function
- ❑ Read all fields in table ProgramFlow (to control the program flow during execution)
- ❑ Read all fields of the table TestLamps where TestData.TestID = TestLamps.TestID
- ❑ Read all fields of the table Lamps where TestLamps.LampID = Lamps.LampID and add each lamp in the order of TestLamps.Counter
- ❑ Read all fields of the table TestValues where TestID=TestData.TestID and order them by OrderNo (this reads all values for each test function defined in the test program
- ❑ If the test data contains light distributions, read all fields from table Results where TestID=TestData.TestID ordered by OrderNo. The field File contains the name of the file with the distribution data located in the write protected folder.

  Note:

  Not all tables must be available in the test data base. Tables may be depending on the application of the Limes program and appear in special cases only.

Database fields contain formatted information. Typical formats are Long (only numbers), text (limited number of characters) or memo (up to 2 MB of information as text).

Example of test data, test program and lamp database

```
G:\Lmt\Limes\LMTData\LMTTestProgs.mdb
```
Updated at 05.02.2001 11:58:26 552KB

LMT LIMES 2000 Database

========================

Version LIMES Programs 3.0.1204

Tables:

=======

CHScan	14 Records	Functions Colorscan
Color	167 Records	Functions Color measurement
ECEZone315	2 Records	Functions ECEZone315
Flows	75 Records	Program flows
FrontFog	1 Records	Functions Rear fog lamp measurement
Functions	505 Records	Functions list
Lamps	9 Records	Test lamp information
Luminance	6 Records	Functions Luminance measurement
Maximum	10 Records	Functions Maximum
Point	246 Records	Functions Point measurement
Programs	75 Records	Test program information
Results	95 Records	Test results
Retro1000	19 Records	Functions Retro 1000 measurement
ScanH	19 Records	Functions Horizontal Line Scan
ScanV	2 Records	Functions Vertical Line Scan
ScanX	38 Records	Functions Horizontal Scan
ScanY	11 Records	Functions Vertical Scan
TestData	124 Records	Test data information
TestLamps	152 Records	List of test lamps
TestValues	782 Records	List of test values
Zones	10 Records	Zones

CHScan Fields:	Format	
===============	======	
ProgID	long	Program identifier
OrderNo	long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
X2		
X3		

110

Y1
Y2
Y3
Save
Speed
MinValue
MaxValue
ReaimRadius

Color Fields:

=============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
X1		
Y1		

ECEZone315 Fields:

==================

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
X2		
X3		
Y1		
Y2		
Y3		
Save		
DoReaim		
ReaimRadius		

Flows Fields:

=============

ProgID	Long	Program identifier
UseProgramFlow		
EInput		

AInput
ERamp1Up
ARamp1Up
ELightsOff1
ALightsOff1
EMove1
AMove1
EBurnin1
ABurnin1
EExecute1
AExecute1
EMoveToZero1
AMoveToZero1
ERamp1Down
ARamp1Down
ESwitchTo2
ASwitchTo2
ELightsOn1
ALightsOn1
EPause
APause
ERamp2Up
ARamp2Up
ELightsOff2
ALightsOff2
EMove2
AMove2
EBurnin2
ABurnin2
EExecute2
AExecute2
EMoveToZero2
AMoveToZero2
ERamp2Down
ARamp2Down
ESwitchTo1
ASwitchTo1
ELightsOn2
ALightsOn2
EComments
AComments
ESave
ASave

EPrint
APrint
ERepeat
ARepeat
EAiming
AAiming
ECCT1
ACCT1
ECCT2
ACCT2
ECCT0
ACCT0

FrontFog Fields:
================

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X3		
Y3		
Zone		

Functions Fields:
=================

ProgID	Long	Program identifier
ListOrderNr	Long	
ExeOrderNr	Long	
FunctionName	Text	
GroupNr	Long	
PrintOrderNr	Long	

Lamps Fields:
=============

TestID	Long	Test data identifier
Name	Text	
Counter		
User		
NLamps		
Number1		

LampName1	Text	
SetValue1		
Voltage1		
Flux1		
Created		
LastUpdated		
LastUsed		
Type	Text	
Application	Text	
Socket	Text	
Dc		
Group	Text	
Comments	Memo	
Current1		
BurninPeriod1		
Number2	Text	
LampName2	Text	
Current2		
Voltage2		
Flux2		
LampID		
BurnTime1		
LifeTime1		
LifeTime2		
BurninPeriod2		
SetCurrent1		
SetVoltage1		
SetVoltage2		
SetCurrent2		
Ramping1		
Ramping2		
BurnTime2		
BurninTolerance1		
BurninTolTime1		
BurninTolerance2		
BurninTolTime2		
LampRefID	Long	

Luminance Fields:

==================

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	

114

Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
Y1		

Maximum Fields:

===============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
X2		
Y1		
Y2		
DoReaim		
ReaimRadius		
MaxValue		
Resolution		
MinValue		
X3		
Save		
Speed		
Zone		

Point Fields:

=============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
MinValue		
MaxValue		
X1		
Y1		

DoReaim
ReaimRadius
SfminFactor
SfminFunction
SfmaxFactor
SfmaxFunction
Zone

Programs Fields:
================

ProgID	Long	Program identifier
UseCounter	Long	Indicates how often this program is used
Name	Text	
Version	Text	
User	Text	
Description	Text	
Date		
CGamma		
NLines		
Cd		
Nok		
TestProgLibrary	Text	
NLamps		
DoStore		
NMeas		
TestProgGroup	Text	
Id	Text	
Comment	Memo	
UseFminFmax		
DoReaim		
UseSfm		
UseZones		
ShowZonesAnyway		
NZone		
ZoneTitle	Text	
Symmetrical		
HorizontalPosition		
ExecutionTime		
LvkType		
Grid	Text	
ProgRefID	Long	

Results Fields:

===============

TestID	Long	Test data identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
X1		
X2		
X3		
Y1		
Y2		
Y3		
File	Text	Name of the distribution file

Retro1000 Fields:

=================

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
MaxValue		
X2		
F1Min		
MinValue		
X1		
Zone		
Y1		

ScanH Fields:

=============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
X2		
X3		

MaxValue
Y1
DoReaim
ReaimRadius
MinValue
Save

ScanV Fields:
=============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
MaxValue		
Y1		
Y2		
Y3		
Save		
ReaimRadius		
Zone		

ScanX Fields:
=============

ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
X1		
X2		
X3		
Y1		
Y2		
Y3		
Save		
Min	Text	
Max	Text	
MaxValue		
DoReaim		
ReaimRadius		

Zone
MinValue
LineMin

ScanY Fields:
=============
ProgID	Long	Program identifier
OrderNo	Long	
Name	Text	
Text	Text	
Unit		
Min	Text	
Max	Text	
X1		
X2		
X3		
Y1		
Y2		
Y3		
Save		
ReaimRadius		

TestData Fields:
================
TestID	Long	Test data identifier
ProgID	Long	Program identifier
TestName	Text	
TestDate		
TestOperator	Text	
TestProgOrg	Text	
TestOrg	Text	
TestNumber	Text	
TestReport	Text	
TestMeasNo	Text	
TestComment	Text	
BitMapFile	Text	
NLamps	Long	0, 1 (single filament) or 2 (dual filament)
NBulbs	Long	No of lamps (bulbs) used in the test data
TestRLDriving		
TestHeadNr		
TestDistance		
TestUnit		
Distributions		

Xoffset		
Yoffset		
PhotoFile	Text	
TestOperatorShift	Text	
Cavity	Text	
Coating	Text	
TestSection	Text	
StandName	Text	
MultiSample		
M1V1		
M2V1		
M3V1		
StandPurpose	Text	
StandLocation	Text	
M1V2		
M2V2		
M3V2		
TestRLMounting	Text	
LampActive	Text	
OptionGraphic	Text	
OptionGrid	Text	
Area		
Length		
Width		
Height		
Diameter		
L1Current1		Information of the first filament
L1Voltage1		
L1SetCurrent1		
L1SetVoltage1		
L1Current2		Information of the second filament
L1Voltage2		
L1SetCurrent2		
L1SetVoltage2		
StandDescription	Text	
StandComment	Memo	
StandXoffset	Text	
StandYoffset	Text	
StandCCTX		
StandCCTY		
StandCCTZ		
StandXoffset2		
StandYoffset2		

StandCCTX2
StandCCTY2
StandCCTZ2

Stand2Name	Text	
Stand2Purpose	Text	
Stand2Location	Text	
Stand2Description	Text	
Stand2Comment	Memo	

Stand2Xoffset
Stand2Yoffset
Stand2CCTX
Stand2CCTY
Stand2CCTZ
Stand2Xoffset2
Stand2Yoffset2
Stand2CCTX2
Stand2CCTY2
Stand2CCTZ2

Id	Text	
LibName	Text	
GroupName	Text	

TestLamps Fields:

=================

TestID	Long	Test data identifier
LampID	Long	Lamp identifier
Counter	Long	Order no. of lamps in the luminaire

TestValues Fields:

==================

TestID	Long	Test data identifier
OrderNo	Long	

Value
Hvalue
Vvalue
Hreaim
Vreaim
Reaim
XValue
ZValue
MinValue
TcValue

Zones Fields:

=============

ProgID	Long	Program identifier
OrderNr	Long	
Zone		
MinValueZone		
MaxValueZone		
MinZone		
MaxZone		

LIMES ASCII file format

LIMES ASCII files contain the information about a complete set of information for a single test, consisting of

- ❑ Test sample data
- ❑ Test lamps
- ❑ Test program
- ❑ Test results

The LIMES ASCII format is a structured file format. The structure is given by headlines, enclosed in brackets ([ ]). Each headline starts a certain section, end is ended by a footlines, again enclosed in brackets ([ ]). Within a section can be subsections, for instance multiple lamp sections if more than one lamp is used in the sample. Subsections are enclosed in this kind of brackets ({ }).

The typical LIMES ASCII looks like shown in the example below. The content of the file is shown in the selected font like `BeginSample`. Explanations are inserted in *this kind of font* and do not exist in the ASCII file.

Structure of LIMES ASCII files

The structure of LIMES ASCII files is defined like this:

```
Version= LMT LIMES95 ASCII File Version 1.0

[BeginTestComment]
```
lines containing data
```
[EndTestComment]

[BeginSample]
```
lines containing data
```
[EndSample]

[BeginLamp]
{BeginLamp  1 }
```
lines containing data
```
{BeginLamp  2}
```
lines containing data
```
{BeginLamp  N..}
```
lines containing data
```
[EndLamp]

[BeginProgram]
ProgramNLines= N.. (N = 1, 2, 3, …)
```
lines containing data
```
{BeginProgramLine  1 }
```
lines containing data
```
{BeginProgramLine  2 }
```
lines containing data
```
{BeginProgramLine  N.. } (N = 1, 2, 3, …)
```
lines containing data

123

```
{EndProgramLine}
[EndProgram]

[BeginDistribution]
Distribution=  N (N = 1, 2, 3, …)
```

lines containing data

```
{BeginResults  1 }
{BeginValuesInLx}
```

lines containing data

```
{EndValuesInLx}
{BeginValuesInCd}
```

lines containing data

```
{EndValuesInCd}
{BeginResults  2 }
{BeginValuesInLx}
```

lines containing data

```
{EndValuesInLx}
{BeginValuesInCd}
```

lines containing data

```
{EndValuesInCd}
{BeginResults  N.. } (N = 1, 2, 3, …)
{BeginValuesInLx}
```

lines containing data

```
{EndValuesInLx}
{BeginValuesInCd}
```

lines containing data

```
{EndValuesInCd}

{EndResults}
[EndDistribution]

[EndOfFile]
```

Example of LIMES ASCII file

```
Version= LMT LIMES95 ASCII File Version 1.0

[BeginTestComment]
```

This section contains the content of the comment information. It can consist of multiple lines, and is ended at the next footline.

```
Test measurement with GO-H 1300
[EndTestComment]

[BeginSample]
```

This section contains the individual values for the properties of the test sample. Only properties different from default values (like Zeros) are shown. The order of values can vary and is not important.

```
TestProgOrg= AL_FL_RA
TestOrg= AL_FL_RASTER -8 4 (cd)
TestName= LMT Headlamp H4 Datei E0
TestNumber= 001
TestReport= LMT #001
TestMeasNo= #001
```

```
TestDate= 28 Nov 1999
TestOperator= Ra/LMT
TestComment= Test measurement with GO-H 1300
TestRLDriving= Right Hand Traffic
TestRLMounting= Left Side Mounting
TestHeadnr= 1
TestDistance= 25 m
TestUnit= cd
Nlamps= 1
PhotoFilePath= D:\Lmt\Limes2000\TestData\AsciiFiles
BitMapFilepath= D:\Lmt\Limes2000\TestData\AsciiFiles
[EndSample]

[BeginLamp]
```

This section contains the information of the lamp(s) used in the test sample, if any.

```
LampDc= AC
LampNLamps= 1
LampNumber1= #12
LampLampName1= Testlamp H4
LampSetValue1= 2 Set current
LampCurrent1= 4,492 A
LampVoltage1= 11,97 V
LampFlux1= 750 lm
[EndLamp]

[BeginProgram]
```

This section contains the general test program information.

```
ProgramNok= NOK
ProgramNLines= 1

{BeginProgramLine  1 }
```

This section contains the program information for each program line

```
Value= 22260 cd
{EndProgramLine}
[EndProgram]

[BeginDistribution]
```

This section contains the information about available light distributions

```
Distribution=  1

{BeginResults  1 }
```

This section contains the information about each available light distribution table

```
XStart= -18
XEnd= 18
XStep= 0,2
YStart= -8
YEnd= 4
YStep= 0,2
Z1= 181
Z2= 61

{BeginValuesInLx}
```

This section contains the data of the light distribution in lx or cd/klm. Each line contains one value, starting from tha angle Xstart in steps of the angle Xstep until the angle Xend. The table starts at the first angle

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Ystart, then shows a full line of each values for X, then continuing with the next angle Y by increasing the angle Y with Ystep.

```
9,101374E-02
9,410555E-02
9,535544E-02
9,754766E-02
9,880735E-02
0,1010152
0,1041801
0,1054579
0,1067384
0,1099212
… more lines of values
1,152924
1,15121
1,152164
1,160357
1,161161
1,167408
1,173556
{EndValuesInLx}

{BeginValuesInCd}
```

This section contains the data of the light distribution in lx or cd/klm. Each line contains one value, starting from tha angle Xstart in steps of the angle Xstep until the angle Xend. The table starts at the first angle Ystart, then shows a full line of each values for X, then continuing with the next angle Y by increasing the angle Y with Ystep.

```
66,58
68,61
69,29
70,65
71,33
72,69
74,73
… more lines of values
847,1
844,4
845,8
849,2
858
861,4
868,9
876,4
{EndValuesInCd}
{EndResults}
[EndDistribution]

[EndOfFile]
```

This is the last line in the ASCII file.

LIMES 2000 Reference

General

Start LIMES 2000

General

The LIMES program (executable file, Limes.exe), after normal installation located in the folder \Program files\Lmt\Limes2000, is only one component of the LIMES 2000 program system, which usually also includes the other programs LimesControl (executable file LimesControl.exe) and Translator (executable file Items.exe). To do measurements with the connected LMT hardware it is also necessary to start the LimesControl program. This can be done as described in the LimesControl Reference Manual, but could also be started automatically. The necessary configuration for this is described in the section Program Options. The translator program can also be started from the Limes program menu Translate, which is a submenu of the Options menu.

Program start

The Limes program can be started usually by

- ❑ Double clicking on the Limes icon automatically created on the desktop from the installation program or
- ❑ Selecting the Limes 2000 menu from the WINDOWS start menu
- ❑ Double clicking on the Limes.exe file in the WINDOWS Explorer
- ❑ Using the Execute menu of the WINDOWS start menu and entering the proper path to Limes.exe

First start

The procedure performed if the Limes program is started for the first time after installation is described in the General information manual, section Getting started.

First start after update

The procedure is usually the same as for the normal start, only the initialization process takes more time, as the program checks all databases for compatibility with the new version. Additionally the First Start Message is displayed as shown in the General Information manual, section Getting started.

Normal start

In normal use, after starting the Limes program as described above, the following steps are performed:

1) The LIMES Start window appears on the screen
2) The user logs in with his password (see Login)
3) The LIMES Welcome splash screen appears and disappears after a couple of seconds
4) The LIMES main window is displayed
5) The LimesControl program is started and connected to the LIMES program
6) The last file used during the last session is loaded from the database

Note:

Step 2) can be omitted if selected in the Operators Selection session.

Step 2) will happen before Step 1) if more than one application is available

Step 5) will happen only if selected in the Options menu Program Options

Program termination

The LIMES program can be terminated by

- ❑ Selecting Exit from the main File menu
- ❑ Clicking of the Exit button in the main toolbar

Start LIMES 2000

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In normal use, after starting the Limes program as described above, the following steps are performed:

7) The LIMES Start window appears on the screen

8) The user logs in with his password (see Login)

9) The LIMES Welcome splash screen appears and disappears after a couple of seconds

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Program termination

The LIMES program can be terminated by

- ❑ Selecting Exit from the main File menu

❑ Clicking of the Exit button in the main toolbar

Main Window

After showing the LMT LIMES 2000 Welcome splash screen the program starts with the main window.
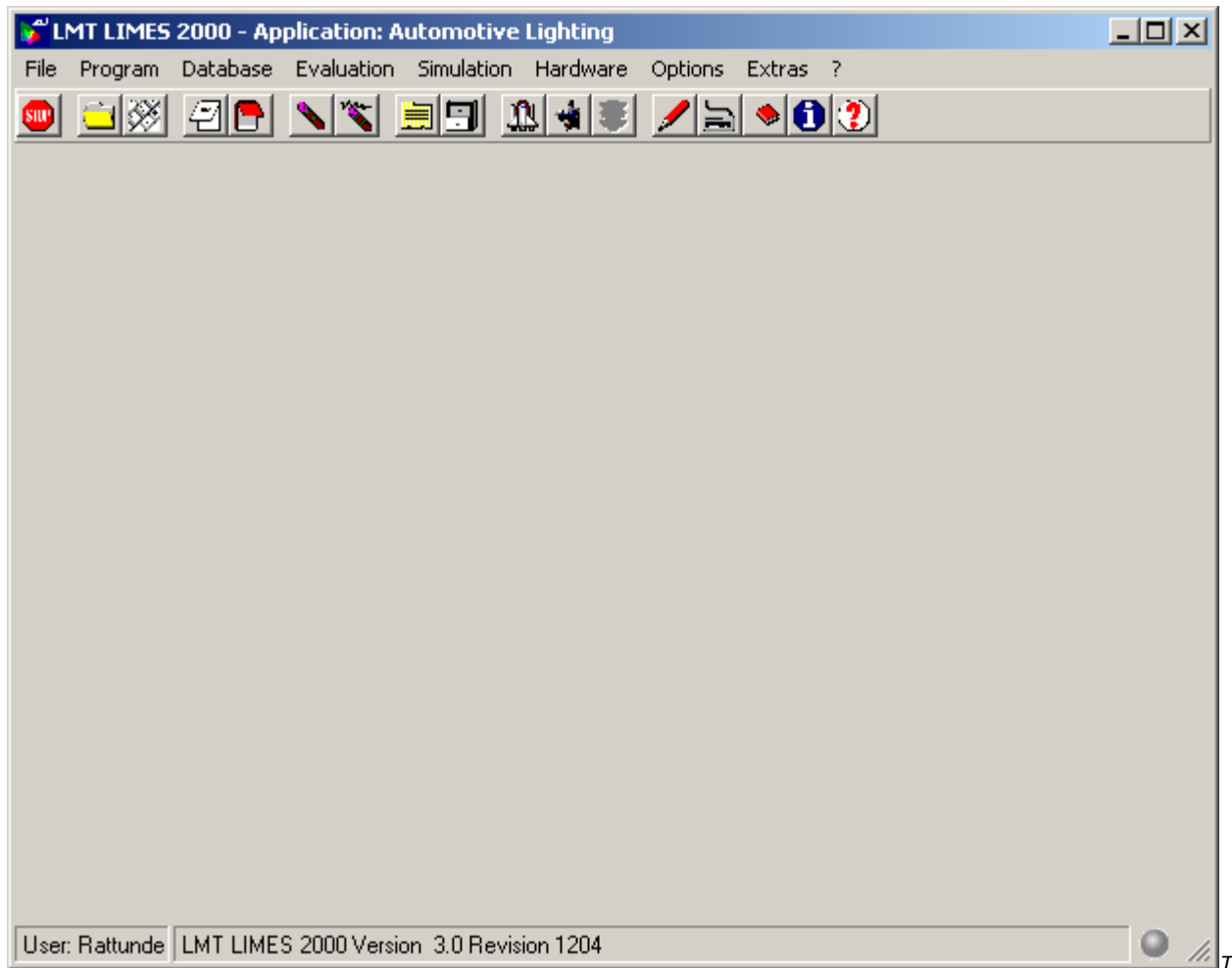
his image contains hot spots

To start working with the program you can use either the menus form the main menu bar or click on one of the buttons on the tool bar.

When no test sample and no test program has been loaded, user and program version is shown in the status bar on the bottom of the window.

When a test sample and/or a test program has been loaded, the sample and program name is shown in the status bar on the bottom of the window.

Detailed information about the sample and/or the program can be displayed in the main window, if the corresponding buttons have been clicked on the tool bar. To hide the detailed information click the buttons again.

Main menu

Most of the functions of the LMT LIMES 2000 program can be controlled from the main menu of the Limes main window. Another possibility is the use of the button bar below the menu bar.

The main menu bar consists of the following menus:

File

    New

    Open

        New file

        Remove open files

        Add open files

    Edit sample

    Assign lamp multiplexer

    Save

    Save As. . .

        LIMES database file

        LIMES ASCII file (ATF)

        … other file formats

    Import from. . .

        Any supported file format

        LIMES ASCII file (ATF)

        … other file formats

    Convert

    Print

    Select protocols

    Print setup

    Print preview

    Exit

Program

    New

    Open/Save

    Edit

    Execute

    Execute in source file

    Import from. . .

        LIMES program file (LPF)

        … other file formats

    Export as. . .

Database

    Lamps

        Edit lamp

        Open lamp

        Import lamps

Operators

User logon

Edit .INI File

Applications

Extras

Color calculator

Translate

Windows

Show files

Show test data

Show test program

Icons

Small icons

List

Details

Arrange icons

?

Help

About

User info

Hardware info

Some of the menus show sub menus when they are selected. Some menu items may not be visible or other menu items may be available, depending on the configuration of your system. If e.g. no goniometer is connected to your system, the menu Hardware/Move goniometer is not shown.

Main Window Examples

It is possible to display the content of the actual test data file in the main window. The display is separate for sample an program data, both can be displayed alone or together.
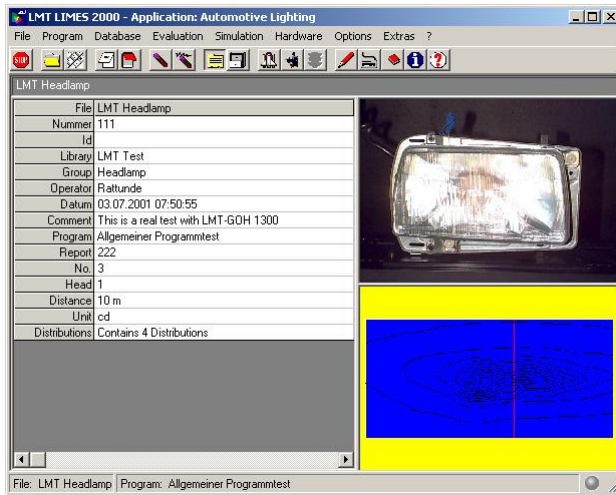
Main window with detailed sample data
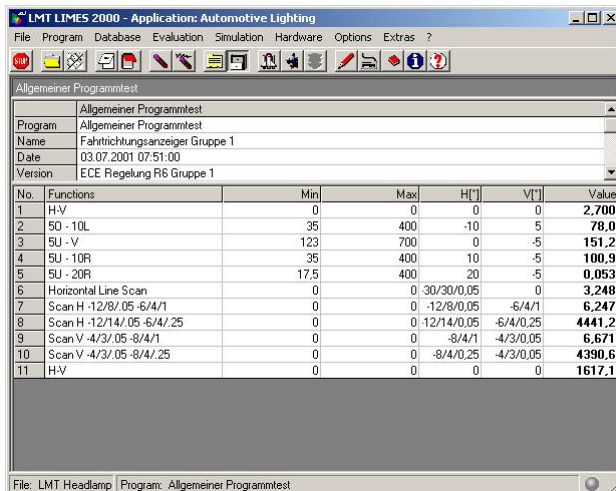
Main window with detailed test program data
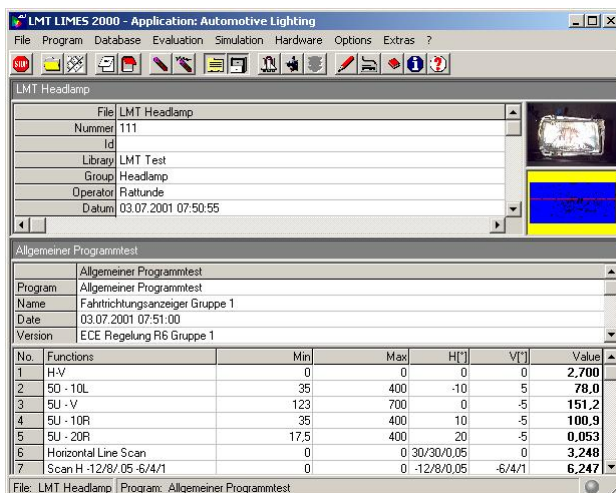
Main window with detailed sample and test program data

Main Toolbar

Many functions of the LMT LIMES 2000 program can be controlled from the main toolbar buttons of the Limes main window. Another possibility is the use of the menu bar.

This image contains hot spots

To see the meaning of a button, hold the mouse cursor on top of it. After a short while a tool tip displays the information beneath the mouse cursor.

Exit: Exit LMT Limes 2000 program

Open sample: Open sample database

Open program: Select new program from program database

Edit sample: Edit actual sample data

Edit program: Edit actual test program

New sample: New test sample. Clears all actual test sample data

New program: New test program. Removes actual test program from actual test sample

Data: Show actual sample data

Program: Show actual test program

Execute: Execute actual test program

Connect: Connect to LimesControl

Move: Move goniophotometer

Options: Changing start options

Calculator: Displays color calculator

Translate: Invokes Limes Translator program

Info: Information and settings

Help: Show LMT LIMES 2000 help

> *Note:*
> *The number of displays buttons and the picture displayed in some of the buttons depend on the setting available in your system, e.g.:*

- *The gonio picture depends on the actual goniometer*
- *The gonio picture is not displayed, if no goniometer is connected*

Exit

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to terminate the LMT LIMES 2000 software. With this menu the LimesControl program can be terminated as well, if the proper configuration has been made in the menu Options/Program.

Databases

There are several databases used from the LMT LIMES 2000 software, which are compatible to the Microsoft ACCESS database format. Some databases are created by default and are given a name from the program itself, but can be renamed by the user. Also new databases of all kinds can be created by the use.

Database files have the extension .mdb (Microsoft Data Base). There is one exception: each system requires the presence of a special user database (extension .udb), which cannot be accessed or edited from programs like Microsoft ACCESS or EXCEL.

> *Note:*
> *The user database file (.udb) is maintained only by the program itself, any modification to it or removing of this database file from the system will cause the software to stop working.*

The following default databases are available, depending on the application of the LMT LIMES 2000 software and its installed components.

Limes.mdb   Test data, test program and test lamp database

Lamps.mdb   Test lamp database

Options.mdb   Start options and settings for the LIMES program

Iso.mdb   Isolux or iso-candela values

Stands.mdb   Stand databases for test sample holders

Autos.mdb   Automobile databases with definitions for automotive road lighting simulation

Roads.mdb   Road databases with definitions for automotive road lighting simulation

Export program as ...

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to export test programs into external ASCII files in on of the available LMT LIMES 2000 file formats.

Main Window Examples

It is possible to display the content of the actual test data file in the main window. The display is separate for sample an program data, both can be displayed alone or together.
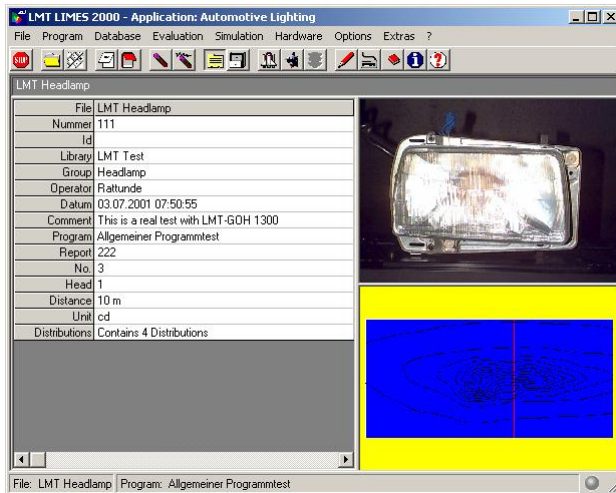
Main window with detailed sample data
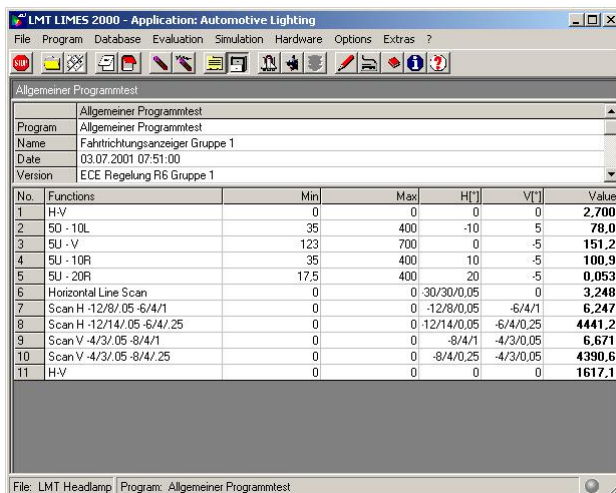
Main window with detailed test program data
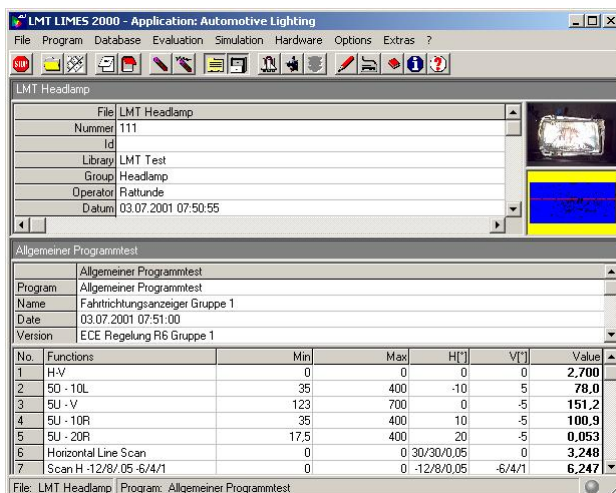
Main window with detailed sample and test program data

Options

This item is a menu item of the Limes Main Menu.

The options menu contains all submenus to access all settings used by the Limes and LimesControl programs.

The individual menu items can also be accessed by the start options window, after selecting start options from the Options menu.

Page setup

The page setup window can be accessed from the printer setup window.

The page setup allows a creation of several standard page formats which can be saved with a name into a database.

Each page can have its individual orientation, margins, headers, footers, and logos or bitmaps at any location.

Select scheme

A pre-defined page can be received from the database. A page can be created or modified, saved with the same or a new name, or deleted.

Save: Save the page with the same name

Save As: Save the page with the new name

Delete: Delete the page

O.K.: Accept and terminate.

Cancel: Do not accept and terminate

Page size: The picture shows a layout of a selected page. The upper area on top is the header area (marked red), the lower area at the bottom the footer area (marked green). The printable area between the

left and right margins is shown in yellow color. Any bitmapped assigned to the page is displayed (the LMT symbol as an example).

Format portrait/landscape: Select the page orientation

Dimensions: Enter page dimensions either in cm or inch

Margins: Enter the margins in the selected unit

Header file: Select a valid header file (extension .rtf) to be displayed on top of the page by clicking on the select button

Header: Print the content of the header file as header on each page

Header Top: Distance between header text and top margin

Footer file: Select a valid footer file (extension .rtf) to be displayed on top of the page by clicking on the select button

Footer: Print the content of the footer file as footer on each page

Footer Top: Distance between footer text and bottom margin

Help menu

This item is a menu item of the Limes Main Menu. Any sub-menu in this menu displays special information about the hardware and software and shows the LMT LIMES 2000 on-line help.

The help menu has the following entries:

This menu invokes the display of the list of content of the full LIMES 2000 documentation

This menu shows the LIMES splash screen

This menu displays the actual version and revision number of the running LIMES software

This menu displays the user information about licenses, functions, databases, etc.

This menu displays the list of available hardware, and has additional information about special DLL-files (Dynamic Link Libraries), which contain compiled functions of the LIMES software

File menu

File

This item is an menu item of the Limes Main Menu.

This menu item is used to select other items related with test sample data, like loading, editing or printing. It also contains the menu item for terminating the LMT LIMES 2000 software.

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New
Open ▶

Edit Sample

Save
Save As... ▶

Import From... ▶

Print
Preview

Exit

1: LMT-VW A01r.4I01
2: LMT H4 Headlamp
3: LMT H7 Headlamp 2 beams
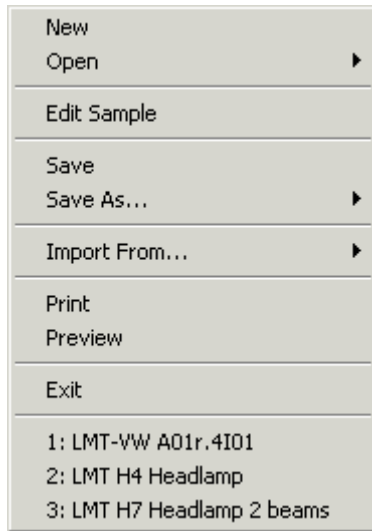
This image contains hot spots

Add open files

This item is a submenu item of the file menu of the Limes Main Menu.

It allows manipulating files which have been opened from the database, in the following ways:

- ❑ Add result values of 2 or more files and save the result in one of the opened files
- ❑ Add light distributions of 2 or more files and save the result in one of the opened files, either replacing an existing light distribution or creating a new one
- ❑ Subtract result values of 2 or more files from the result value of one file and save the result in one of the opened files
- ❑ Subtract light distributions of 2 or more files from the light distribution of one file and save the results in one of the opened files, either replacing an existing light distribution or creating a new one
- ❑ Building the ratios of the result values of 2 files and save the result in one of the opened files
- ❑ Building the ratios of the light distributions of 2 files and save the results in one of the opened files, either replacing an existing light distribution or creating a new one

The general rules apply:

- ❑ Files must not necessarily have the same size
- ❑ Light distributions must no necessarily have been measured in the same angular range and with the same angular step widths
- ❑ Ratios are given as relative values, identical intensities of 2 files lead to values of 1 in the resulting distribution
- ❑ Subtracting files can lead to negative values. The isolux database can also handle negative iso-values

See more in the "How To" section of this manual.

New

This item is a submenu item of the file menu of the Limes Main Menu.

This menu item clears all properties of the actual sample in the computer memory, including all results if actual measurement values have not been saved, they are lost.

The actual test program however is not cleared from the memory. To do so use the New menu in the Program menu.

Remove open files

This item is a submenu item of the file menu of the Limes Main Menu.

It allows to remove one or more all all opened files from the computer memory. Removed files are not deleted from the database.

Open

This item is a submenu item of the file menu of the Limes Main Menu.

This menu item shows a submenu with one or more items.

The New File item invokes the test sample database window. You can select one ore more files in the database and load them into memory. At the same time the file is also loaded into a stack of opened files, which can carry as many files as allowed by the computers memory limit. All opened files can be evaluated (displayed or printed) in an easy way.

If no file has been loaded before, the New file menu is the only submenu.

If another file has been loaded, the names of the other files appear as submenu items. Additionally the submenu Add files and Remove files appear.

If other open files are listed in the submenus, the user can select any of these files from the stack, without loading them again from the database.
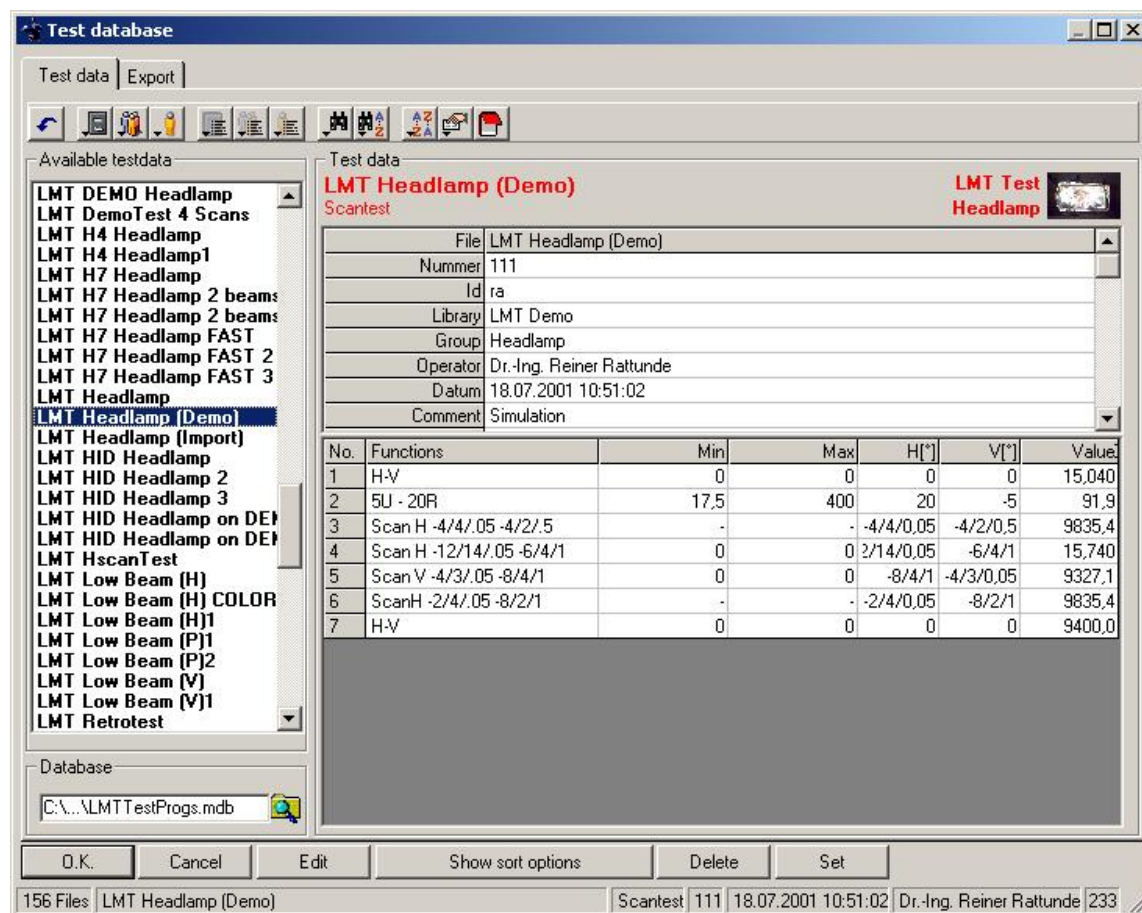
Note:
The size of this window can be changed. Click on the bottom right hand corner and drag the window to a new size.To change the size of the main areas of this window, move the mouse over the separator lines between the areas. Click the mouse and drag the separator lines to a new position. The areas automatically resize. The last size will be saved in the Windows registry and used again at the next time the window is opened.

You can also use the maximize icon on the top right hand corner for full screen display of this window.

Available test data: A list of available test data is displayed. Per default test data names of all available files are displayed. This can be changed using the Show sort options button.

Test data: This window shows the pre-selected test data in detail. 2 areas are displayed: on the top the general data are shown, below the content of the test program functions are listed. The style of display of test functions can be changed in the Options settings for configuration of grids.

Pre select: Click on an entry in the test sample list.

Select: Double-click on an entry, or pre-select and click on O.K.

Select multiple samples: You can load any number of test samples into the computers memory, e.g. if you wish to evaluate them all together at the same time. To do so click on an entry of the sample list, hold down the Shift- or Ctrl-key and click on other entries. All selected samples are loaded an appear in the Open menu.

Delete: Click on the Delete key or press the Del key on the keyboard. The pre-selected test sample will be deleted after confirmation.

Edit: Click here to edit a program or use the Edit test sample menu

Set sort options: Use the tool bar buttons to select sort options of the files in the test sample database

See more information in Filter test database

Show sort options: The sample list can be sorted, or only certain sample can be displayed if special sort options are set. The window changes and the sort options are displayed
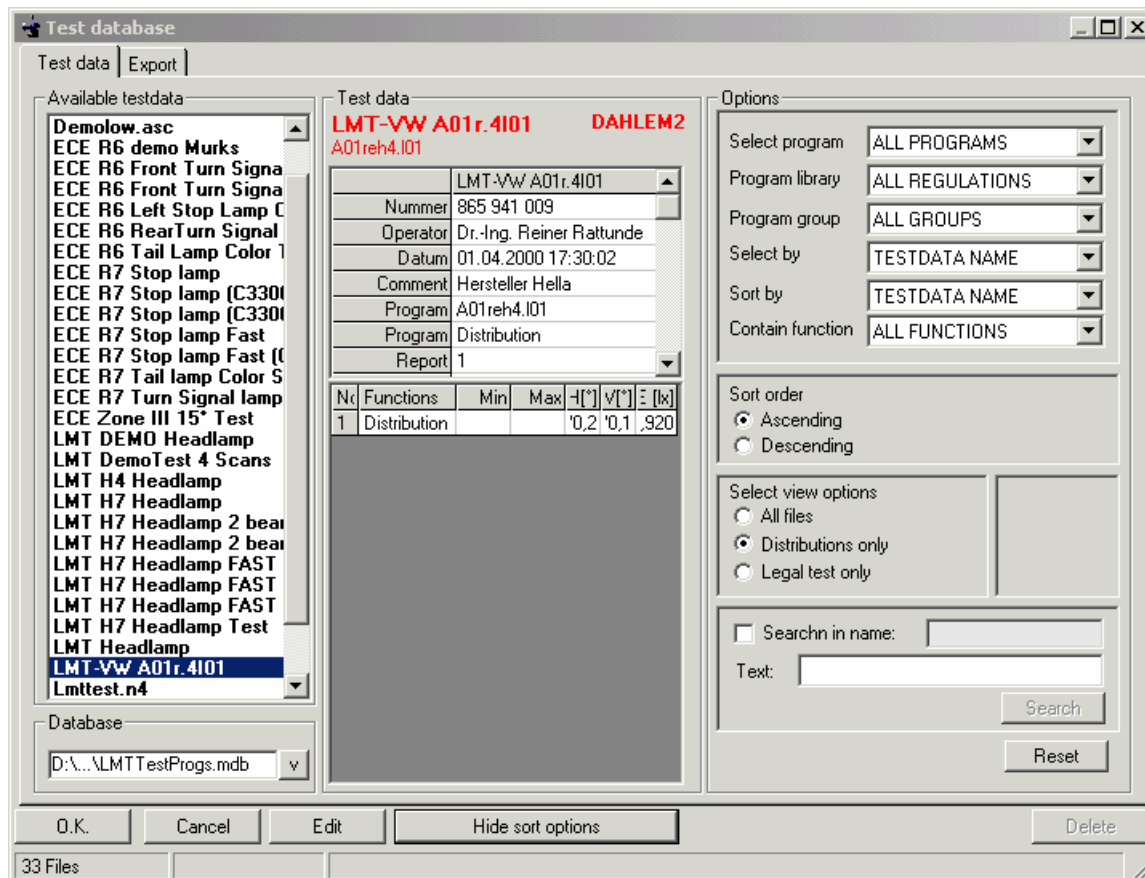
Select program: Either all samples with any test program or only samples which have been measured with the selected test programs are displayed.

Program library: Either all samples with a test program belonging to all test program libraries or only samples with a test program which belongs to the selected test program library are displayed.

Program group: Either all samples with a test program belonging to all test program groups or only samples with a test program which belongs to the selected test program group are displayed.

Select by: The selected characteristic will appear in the test sample list. You can select a sample with its name, its date, etc.

Sort by: The test samples in the sample list are sorted by the selected characteristic.

Contain function: Only test samples, which have been measured with a test program which contains the selected test function are displayed in the sample list.

Sort order: The sample list is sorted alphabetically, either ascending (A to Z) or descending (Z to A)

Select view options: All files do not distinguish. Distributions only show only test sample data, which contain a light distributions (a measurement was made with a test function with the save distribution flag set). Legal test only displays only test sample data which do not contain light distributions.

Search in name: Only names in which the entered text appears are displayed.

Text: Only samples, which contain the entered text within their data are displayed, when the Search button is clicked.

Reset: Displays the default sample list (all samples in then database, selected and sorted by names, ascending)

To go back to the default style of this window, click on the button Hide sort options.

Export test sample data

Test sample data can be exported from one database into another. A new test sample database can be created by this way. To export click on the Export tab on top of the window.
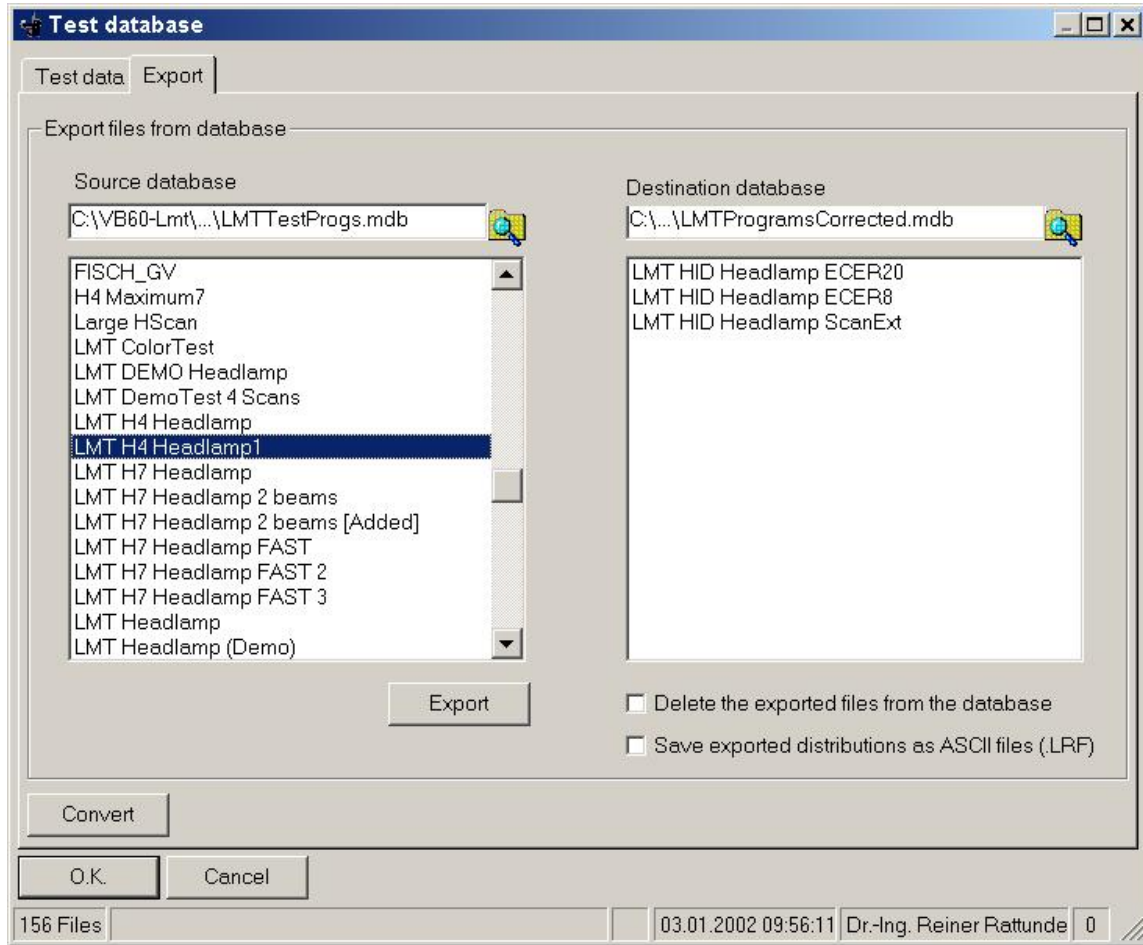
Source database: This is the database from which a test sample data set shall be exported. The field contains the full path name. To select another source database click on the button on the right side of the name field and select a proper LMT LIMES test sample and program database.

Destination database: This is the database into which a test sample data set shall be exported. The field contains the full path name. To select another destination database click on the button on the right side of the name field and select a proper LMT LIMES test sample and program database. If you want to create a new destination database, enter the name which you want to use. When you are asked, confirm "No search for an existing one" and "Create a new one" in the following dialogs.

Dialog Do you want to search for the database?

Dialog Do you want to create a new database?

Export options:

Delete the exported files from the database: Mark this item if you want to move the selected files from the source to the destination database. Test programs used by the test data are copied only. If the test programs are not used anymore by other test data, a message appears whether the unused test program shall be deleted.

Save exported files as ASCII files (LRF): Light distributions can be saved either in binary or in ASCII format (extension .lrf). Use this option if you want to save the exported test data in the destination database in ASCII format.

Export:

To export click on one or select all test samples you want to export, than click the Export button. The exporting will start, depending on the number and size of the selected data it will take a while to process.

Convert:

Clicking on the convert key allows the conversion of selected files of a test database from one of the formats (binary or ASCII) into another. A new window appears and allows the selection of a test database and of files to be converted. The file lists only show files with light distributions.
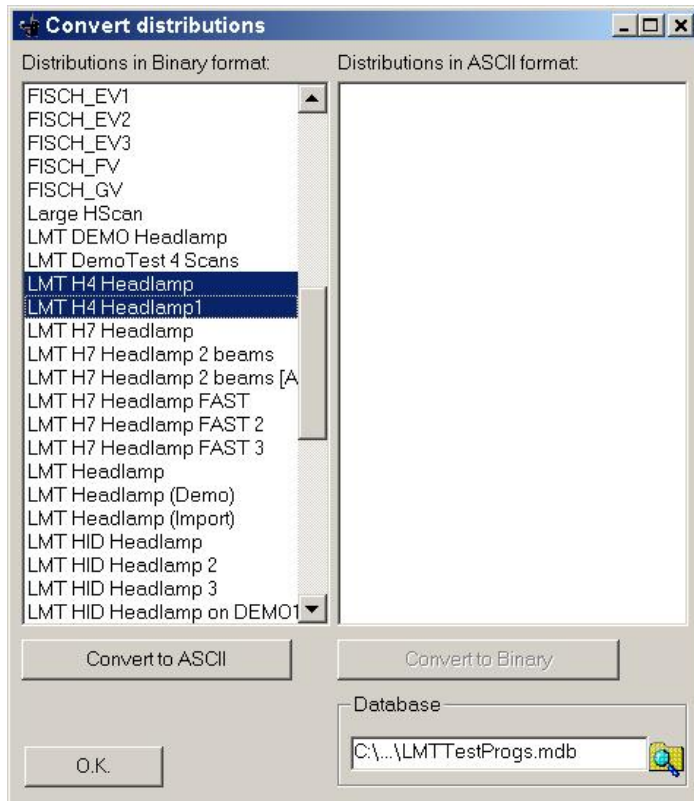
Convert to ASCII: The list above only show files which contain light distributions in binary format. Mark the files you want to convert into ASCII format and click on the Convert to ASCII button.

Convert to binary: The list above only show files which contain light distributions in ASCII format. Mark the files you want to convert into binary format and click on the Convert to binary button.

Database: Select the database you want to process

O.K.: Terminate this window

Filter test database

You can use the tool bar buttons to select sort options of the files in the test sample database. When clicking on one of the buttons of the toolbar, a pull down menu appears and displays the options you can use to filter the test data of the database, change the order of the displayed list, or select test data by other parameters as the name.

Clear: Clears all pre-selections and settings of the toolbar

Libraries: Select only test data files which match with the selected library name. A library can be assigned to a test sample data set in the Edit sample window

Groups: Select only test data files which match with the selected group name. A group can be assigned to a test sample data set in the Edit sample window

ID: Select only test data files which match with the selected identifier. An identifier can be assigned to a test sample data set in the Edit sample window

Regulations: Select only test data files which have been associated with a test program which matches with the selected regulation. A regulation can be assigned to a test program in the Edit program window

Regulations: Select only test data files which have been associated with a test program which matches with the selected regulation. A regulation can be assigned to a test program in the Edit program window

Groups: Select only test data files which have been associated with a test program which matches with the selected group. A group can be assigned to a test program in the Edit program window

Program: Select only test data files which have been associated with a certain test program.

Select test data by…: Select test data by the selected property.

Sort test data by…: Sort test data alphabetically by the selected property.

Select sort order: Select sort order ascending (A …Z) or descending (Z … A)

Select test data options: Select only files which contain light distributions or files without saved light distributions

Select test data containing a certain program function: Select only test data files which have been associated with a test program containing a certain test program function. This option can be used especially for special functions like color measurement etc.

> *Note:*
> *For some of above characteristics your first choices are ALL … (including all files, usually used as default) or [undefined] (the corresponding property in the test sample data is empty)*

Edit Sample

This item is a submenu item of the file menu of the Limes Main menu. Details are given in

■ Edit sample for automotive lighting

■ Edit sample for general lighting

Edit sample (Automotive lighting)

The Edit Sample menu invoked the main sample editor Window. This window shows a number of different pages, which can be accessed by clicking the name on the tabs on top of the window.

In the sample editor you can enter data which goes into the database, is printed on protocols or displayed in windows. Some of the items are meaning less for the system, some have important consequences and have to be filled out properly, to let the system work as it should. The following items are important and have to be entered carefully:

- ❑ Test sample has/has no bulbs or is a special test sample (e.g. headlamp cleaning device)
- ❑ Test sample name
- ❑ Lamps
- ❑ Test distance
- ❑ Left hand traffic/mounting

The sample editor is displayed with a strip of tabs on the top of the window. To click on each tab allows the user to get to different part of data input.

Edit a test sample with lamps – sample tab

Edit a test sample without lamps – sample tab

Edit a test sample for headlamp cleaning tests – sample tab

Sample:

Input of sample descriptions like name, series number, report name etc. The test sample name is principally used to distinguish between different samples in the database. As it is a database entry, it can be up to 256 characters long, and does not have the general restrictions of windows file names.

If a digital photo file in a standard bitmap format is available, it can be linked to the file by clicking on the picture box on the top left corner.

Edit a test sample with lamps – lamps tab

Lamps:

This tab appears only if the sample has bulbs, is either a lamp or a bulb itself. The LMT LIMES 2000 program uses the term light technical term "lamp" for the American term "bulb".

The LMT LIMES 2000 program is designed in a way, that a sample can hold more than one single lamp. Lamps can be added by selecting them from the database (recommended) or by editing them directly. Lamps which have been used recently can be selected easily from the combo list box of last lamps. Selected lamps can be easily replaced by other lamps from the database. See also Lamp databases

Edit a test sample with lamps – test tab

Test:

For goniophotometer tests the photometer heads can be selected or the test distance can be changed. Offset angles for the sample can be entered.

Edit a test sample with lamps – data tab

Data (for automotive lighting):

Special characteristics for the sample can be selected. If a sample is especially used for left hand traffic, and if this has an influence to the test, this should be selected carefully. If a sample is especially used for left hand mounting, and if this has an influence to the test, this should be selected carefully as well.

Edit a test sample without lamps – data tab

Data (for reflex reflectors):

Special characteristics for the sample can be selected. If a sample is especially used for left hand traffic, and if this has an influence to the test, this should be selected carefully. If a sample is especially used for left hand mounting, and if this has an influence to the test, this should be selected carefully as well.

The sample dimensions are used, if the reflex measurement is done in units of cd/lx/m^2.

If a value for the CIL-Factor is given and checked, all results are multiplied by this factor.

If measure reflector on horizontal table is checked, the program assumes that the reflector is oriented like a road mark, that means the light incidence changes from default Zero to 90 deg.

If the Reflex measuring unit (e. g. RETRO 2000) is equipped with a prism to allow observation angles down to Zero deg and if this prism shall be used during test, the proper checkbox should be checked.

If the reflex reflector mounted on a horizontal tabled shall be measured with the cosine of the angle of light incidence to be applied, the proper checkbox should be checked.
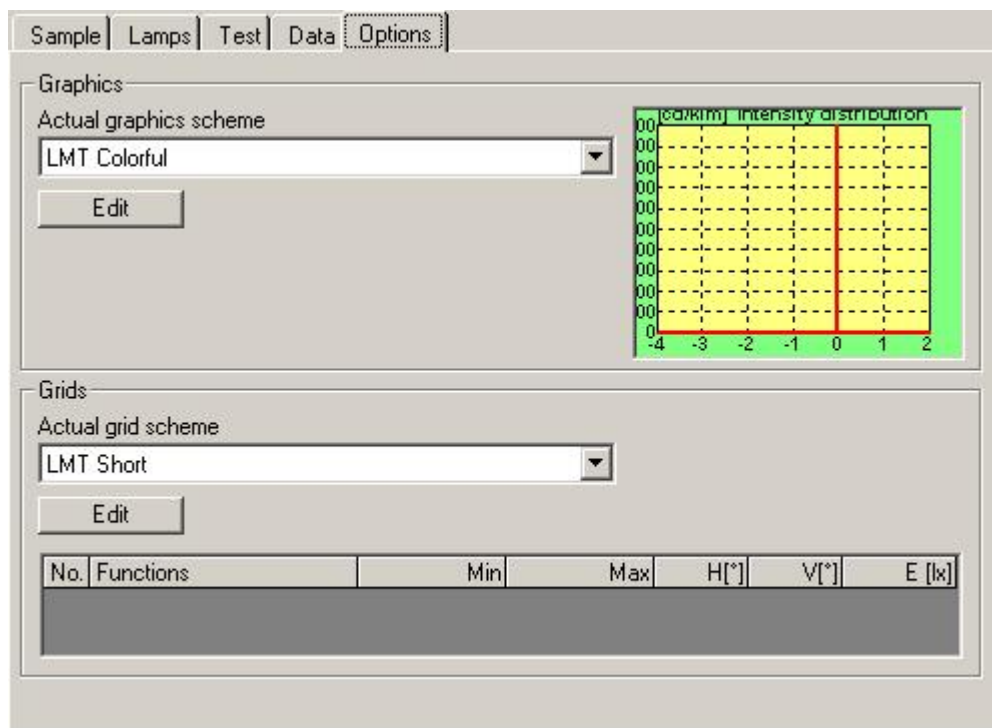
Edit a test sample with or without lamps – options tab

Options:

You can pre-select certain standard graphic schemes, which are initially used, if the test results of the sample are displayed graphically.

You can pre-select certain standard grid schemes, which are initially used, if the test results of the sample are printed in test reports.

Edit sample (General lighting)

The Edit Sample menu invoked the main sample editor Window. This window shows a number of different pages, which can be accessed by clicking the name on the tabs on top of the window.

In the sample editor you can enter data which goes into the database, is printed on protocols or displayed in windows. Some of the items are meaning less for the system, some have important consequences and have to be filled out properly, to let the system work as it should. The following items are important and have to be entered carefully:

- ❑ Test sample is a lamp or a luminaire
- ❑ Test sample name
- ❑ Lamps
- ❑ Test distance

The sample editor is displayed with a strip of tabs on the top of the window. To click on each tab allows the user to get to different part of data input.

Edit a test sample with lamps – sample tab

Sample:

Input of sample descriptions like name, series number, report name etc. The test sample name is principally used to distinguish between different samples in the database. As it is a database entry, it can be up to 256 characters long, and does not have the general restrictions of windows file names.

If a digital photo file in a standard bitmap format is available, it can be linked to the file by clicking on the picture box on the top left corner.

To select a test sample which is a bare lamp for lamp measurement (e.g. luminous flux measurements), select the type of sample as a lamp.

Edit a test sample as a lamp – sample tab

Edit a test sample with lamps – lamps tab

Lamps:

The LMT LIMES 2000 program is designed in a way, that a sample can hold more than one single lamp. Lamps can be added by selecting them from the database (recommended) or by editing them directly. Lamps which have been used recently can be selected easily from the combo list box of last lamps. Selected lamps can be easily replaced by other lamps from the database. See also Lamp databases

Edit a test sample with lamps – test tab

Test:

For goniophotometer tests the photometer heads can be selected or the test distance can be changed. Offset angles for the sample can be entered.

Edit a test sample with lamps – data tab

Data (for general lighting):

Special characteristics for the sample can be selected.

Physical dimensions: The dimensions of the housing of the luminaire or shape of the lamp

Dimensions of luminant areas: The dimensions of the luminant areas of the luminaire following the principles as given by CIE. A76 is the dimension of the projected area of the light emitting surface of a street luminaire (road lantern) as seen from an angle Gamma of 76 deg given in m^2

Tilt: The tilt of the luminaire during measurement

Symmetry conditions: Predefines a light distribution symmetry and displays the data later with this symmetry by default.

Correction conditions: Defines the correction procedure automatically used by default when the light distribution data later is displayed

Luminances (for general lighting):

Glare evaluations for luminaries require the luminances of luminaries in certain directions. Average luminances generally are calculated from the measured intensities and the projected area of luminant surfaces seen from these directions. Certain evaluations like CIBSE-LG3 can also use patch luminances. These luminances are measured with a luminance meter and are maximum luminances in certain directions. This table allows the manual input of such luminances to make them available for glare calculations. These luminances are saved with the test sample data into the test database.

In the table shown above the luminances measured at certain angles Gamma (between 55 deg and 85 deg) and the C-plane, in which they have been measured, can be entered.

For luminaries with louvers the size of the luminant area without the size of the lamella can be entered as well.
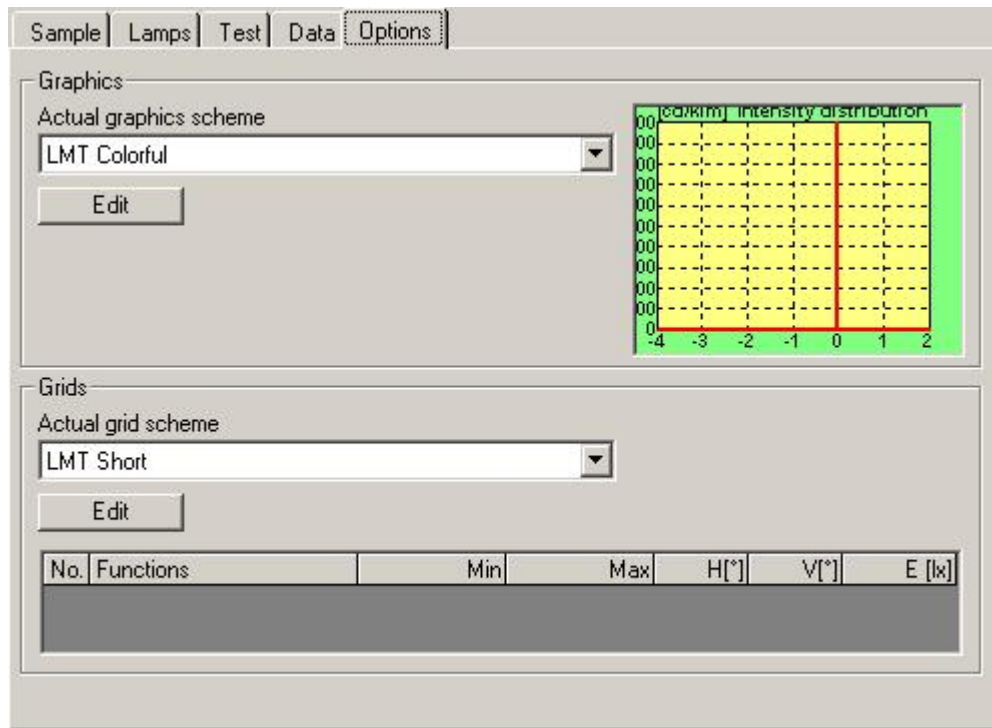
Edit a test sample with or without lamps – options tab

Options:

You can pre-select certain standard graphic schemes, which are initially used, if the test results of the sample are displayed graphically.

You can pre-select certain standard grid schemes, which are initially used, if the test results of the sample are printed in test reports.

Save

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to save the actual test sample data under the same name into the test sample database. The existing data in the database is overwritten by the new data.

Saving is only possible, if the user has entered a test sample name in the Edit sample window.

Save As ...

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to save the actual test sample data under a new name into the test sample database or to convert the test sample data into an ASCII file in a certain file format

Export files menu

LIMES Database file

If a sample data in the database exists, it can be overwritten by the new data.

LIMES ASCII file (ATF)

The test sample data is saved into a single ASCII text file in the LMT LIMES 2000 ASCII file format to the hard disk. The initial folder is defined int the Main menu, Options, Files and Folders.

The file automatically gets the extension .atf.

> *Note:*
> *The list of file formats above is depending on the options available in your LIMES software*

Import From ...

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to import test sample data from an individual ASCII text file of a supported ASCII file format into the Limes program.
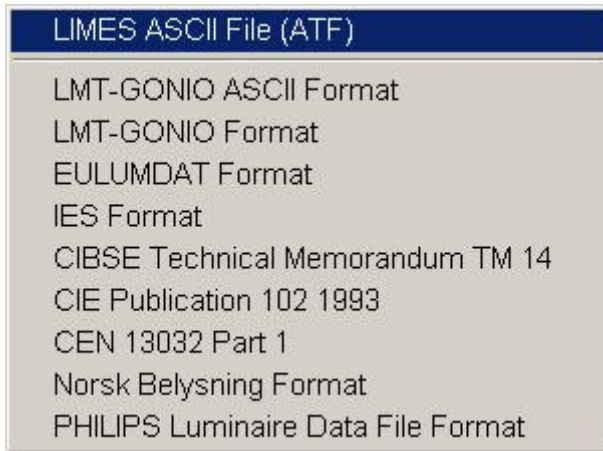
Import files menu

LIMES ASCII file (ATF)

The test sample data is loaded from an ASCII file, which was saved from a LIMES program by using the Save As … menu and selecting the LIMES ASCII file format. The file should have the extension .atf.

> *Note:*
> *The list of file formats above is depending on the options available in your LIMES software*

After you selected the file format you want to import, you can select the files in an explorer window. The files you selected are analyzed and presented in another window.
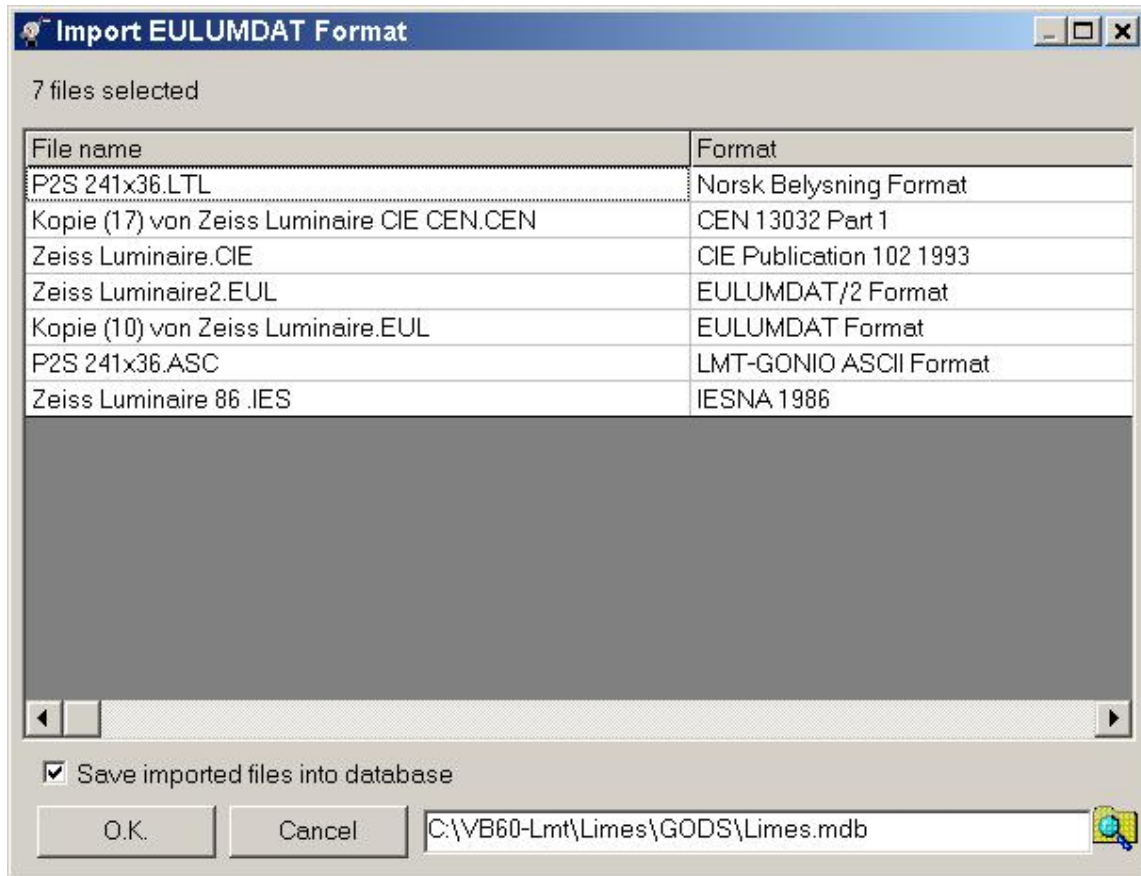
Import files window

The window shows the file names of the selected files on the left, the detected formats on the right side. A format which is unknown to the LIMES software is marked with "-" and cannot be imported.

Save imported files into database: You can select whether the files will be automatically saved into the displayed test database after successful conversion.

Print

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to print a test report from test sample data previously load from the database or measured.

With this item all kinds of test reports can be printed from either the single actual file, or as a multi page report from multiple files.

Reports can be previewed on the virtual printer before they are send to the actual windows printer.

■ Printer setup

■ Page setup

■ Select reports

Preview

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to preview already printed reports by invoking the virtual printer. With this item no new reports can be printed, which are not already in the virtual printer.

■ Vitrual printer

Program menu

Program

This item is an menu item of the Limes Main Menu.

This menu item is used to select other items related with test programs.

| New |
| Open/Save |
| Edit |
| Execute |
| Import from ...   ▶ |
| Export as ... |
| 1: Allgemener Programmtest |
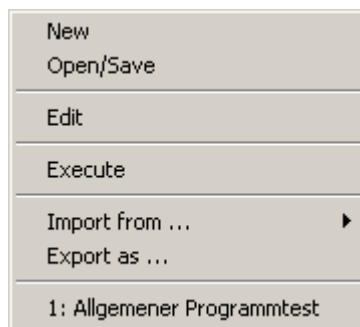
This image contains hot spots

New Program

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to delete the actual program from the computers memory, which is associated with the actual test sample data in the computers memory.

Open program

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to select a new program from the test program database.
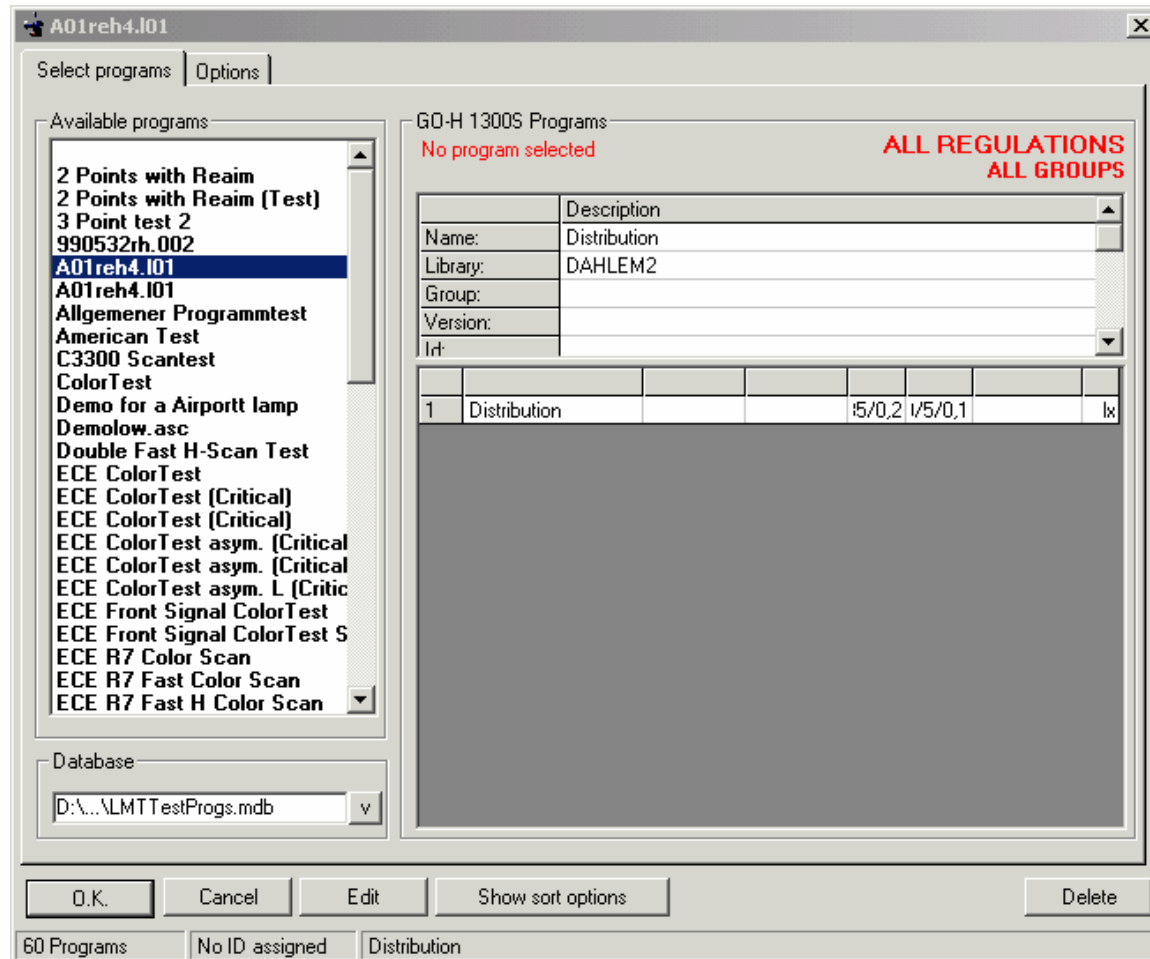
Available test programs: A list of available test program is displayed. Per default test program names of all available files are displayed. This can be changed using the Show sort options button.

Test programs: This window shows the pre-selected test programs in detail. 2 areas are displayed: on the top the general data are shown, below the content of the test program functions are listed. The style of display of test functions can be changed in the Options settings for configuration of grids.

Pre select: Click on an entry in the test program list.

Select: Double-click on an entry, or pre-select and click on O.K.

Delete: Click on the Delete key or press the Del key on the keyboard. The pre-selected test program will be deleted after confirmation.

Edit: Click here to edit a program or use the Edit program menu

> *Note:*
>
> *Only test program which are not used by any test sample data can be deleted. If you really want to delete such a program, delete the associated test sample data first by using the Open test sample data menu.*

Show sort options: The program list can be sorted, or only certain programs can be displayed if special sort options are set. The window changes and the sort options are displayed
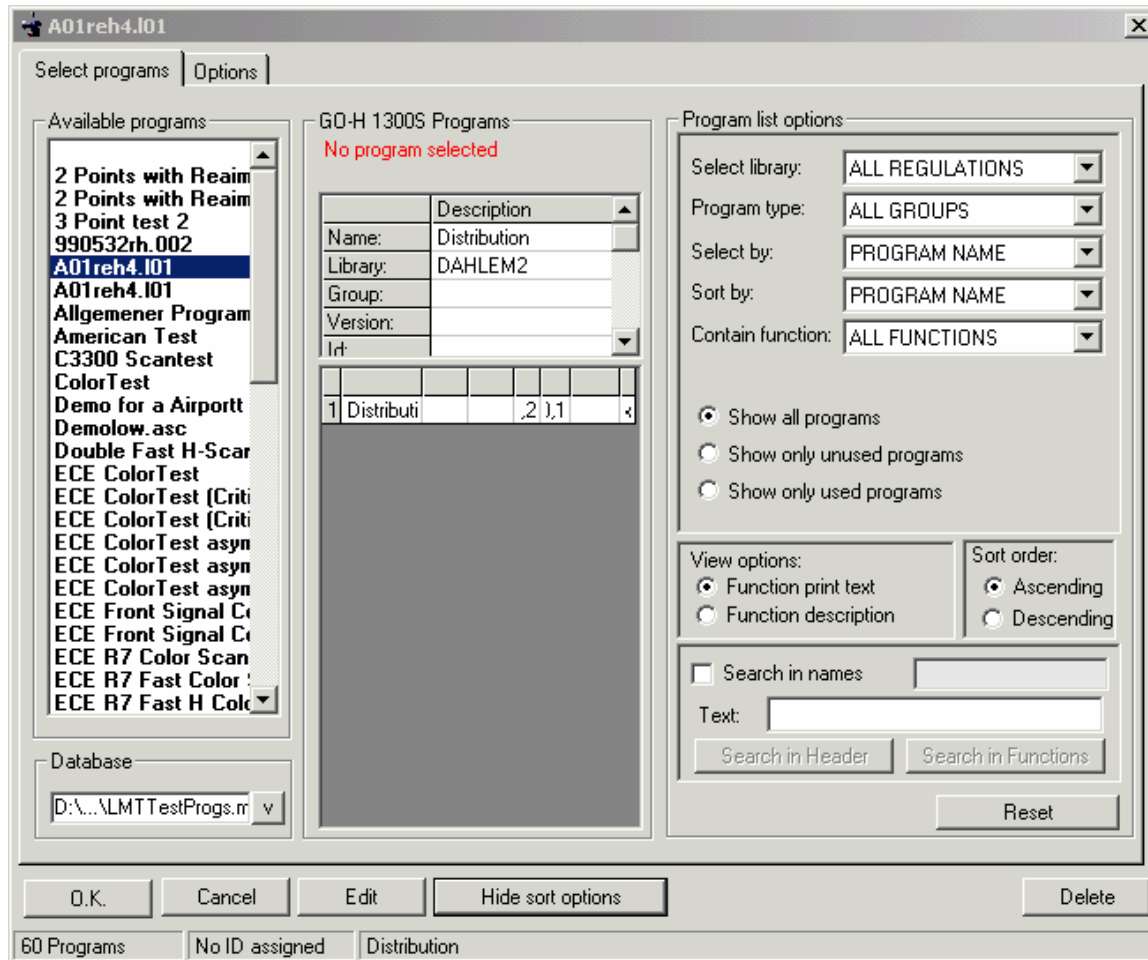
Select library: Either all test programs belonging to all test program libraries or only test programs which belongs to the selected test program library are displayed.

Program type: Either all test programs belonging to all test program groups or only test programs which belongs to the selected test program group are displayed.

Select by: The selected characteristic will appear in the test program list. You can select a program with its name, its date, etc.

Sort by: The test programs in the program list are sorted by the selected characteristic.

Contain function: Only test programs which contains the selected test function are displayed in the program list.

Show all programs: Show all programs in the database which match the selected library or type selection

Show only unused programs: Only programs which have not been used to create a test sample data (by measurement with this program) are displayed.

Show only used programs: Only programs which have been used to create at least one set of test sample data (by measurement with this program) are displayed.

Sort order: The program list is sorted alphabetically, either ascending (A to Z) or descending (Z to A)

Select view options: Show only the printed text or the displayed text associated with a certain test function

Search in name: Only names in which the entered text appears are displayed.

Text: Only programs, which contain the entered text within their data are displayed, when one of the following Search buttons is clicked.

Search in header: The search is limited to the program header.

Search in functions: The search is limited to the program functions.

Reset: Displays the default sample list (all samples in then database, selected and sorted by names, ascending)

To go back to the default style of this window, click on the button Hide sort options.
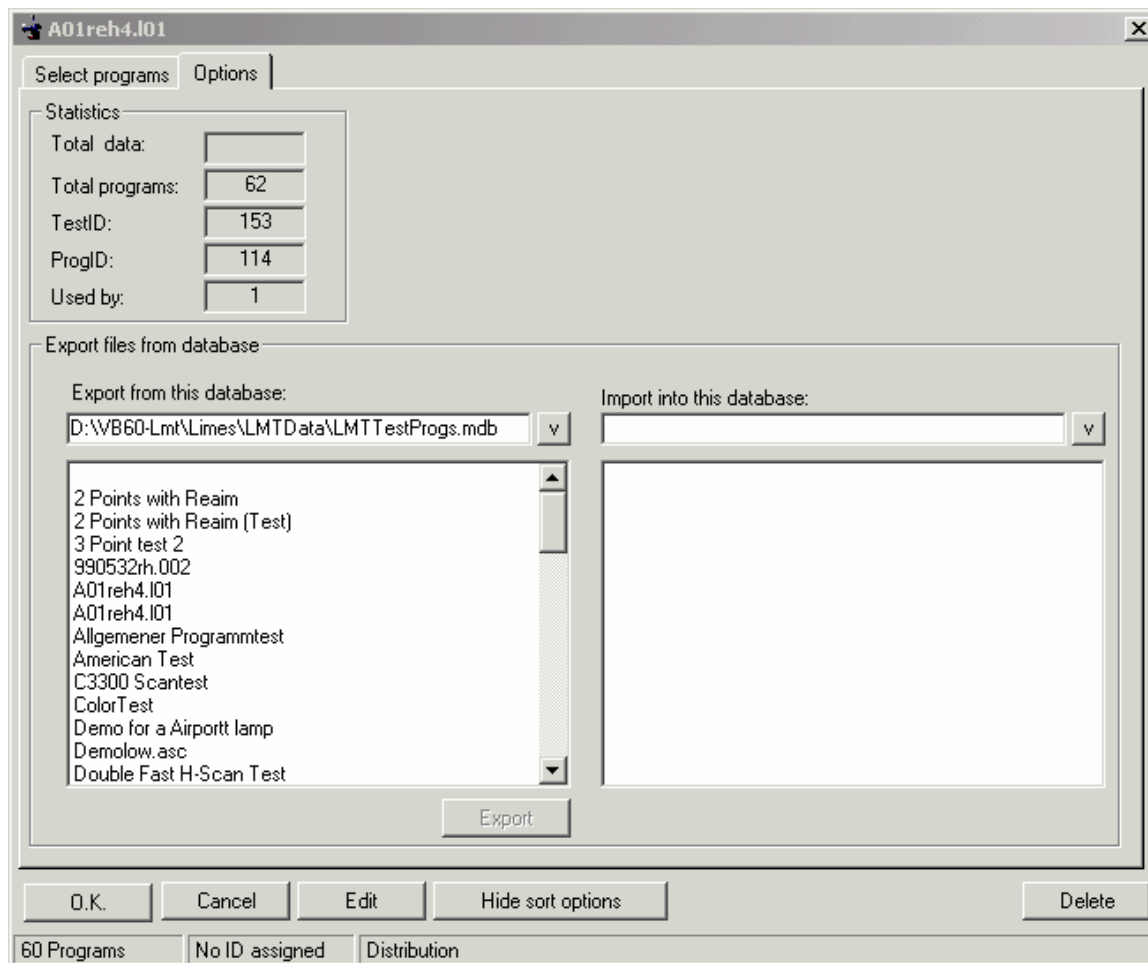
Export test programs

Test programs data can be exported from one database into another. A new test program database can be created by this way. To export click on the Options tab on top of the window.

Source database: This is the database from which a test program shall be exported. The field contains the full path name. To select another source database click on the button on the right side of the name field and select a proper LMT LIMES test sample and program database.

Destination database. This is the database into which a test program shall be exported. The field contains the full path name. To select another destination database click on the button on the right side of the name field and select a proper LMT LIMES test sample and program database. If you want to create a

new destination database, enter the name which you want to use. When you are asked, confirm "No search for an existing one" and "Create a new one" in the following dialogs.

Dialog Do you want to search for the database?

Dialog Do you want to create a new database?

To **export** click on one or select all test programs you want to export, than click the Export button. The exporting will start, depending on the number and size of the selected data it will take a while to process.

Edit program

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to modify the actual test program in the computers memory or create a new test program.

The editing of test programs can be started from the main menu Program or from the program database window.

☐ Edit program for automotive lighting testing

☐ Edit program for general lighting testing

Edit program (Automotive lighting)

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to modify the actual test program in the computers memory or create a new test program.

The editing of test programs can be started from the main menu Program or from the program database window.

Program header

The program header contains general information about the test program.

Edit programs – input of header data

Test program: The name of the test program. Used per default for selecting from the database

Test program long description: Long description of the test program name

Version number: Should give specific information about the version of the test program

Library: Should indicate the related program library or collection, e.g. ECE, SAE, JIS etc.

Group: Should indicate the group of devices test with this program, e.g. headlamps, signal lamps, etc.

Identifier: Name of the author of the test program

Comments: Related information about purpose etc,

Operator: Name of the actual user as logged into LMT LIMES software

Date of creation: Date of creation of test program (resp. modification)

Duration: Period of time required to execute this program. Can only be stated if at least one measurement with this program was executed

Save: Saves the test program back into the program database. If no major modifications have been made, the new test program replaces the existing one even if the name was changed. If major modifications were made, the existing program cannot be replaced if it is used by a test sample data set. To avoid 2 programs with the same name, it is recommended to change the name.

Major modifications: All modifications to a test program which are significant for the test, e.g.

- ❑ Different number of test functions
- ❑ Different order of test functions
- ❑ Different functions
- ❑ etc.

Minor modifications: No restrictions for re-saving test programs into a database while replacing the existing one, e.g.

- ❑ Changing of names, descriptions, or comments
- ❑ Changing of function names
- ❑ Changing of program flow
- ❑ Changing of requirements
- ❑ etc.

Save As. Forces the test program to be saved as a new data set into the database, even if only minor modifications have been done

New: Deletes the entries in the program editor. This item can be used if you want to create a complete new test program

Program control

The program control contains general control functions the test program.
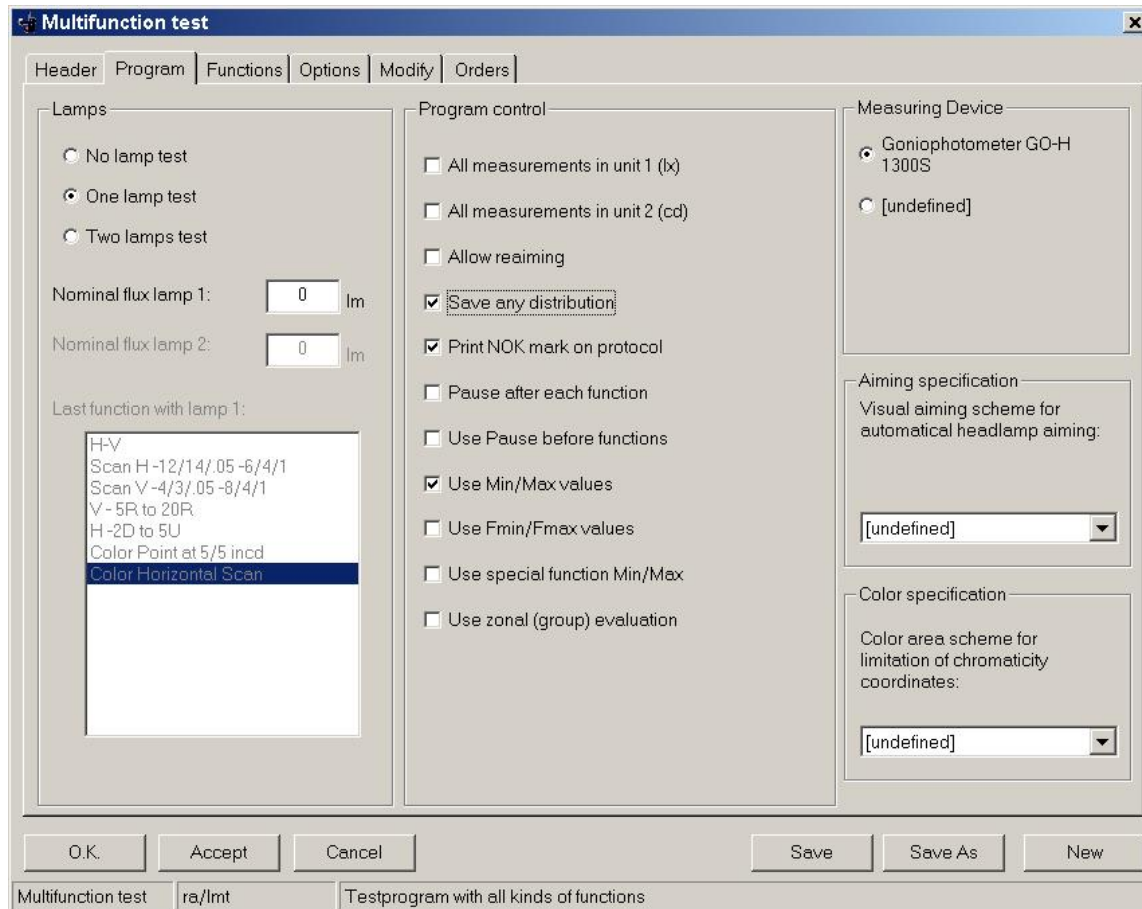
Edit programs – input of program data

Lamps

This section describes the influence of test lamps on a test program

No lamp test: The sample tested with this program contains no bulbs, e.g. a reflex reflector

One lamp test: The sample tested with this program contains one lamp (or more then one lamp, but they are burned together at the same time).

Two lamp test: The sample tested with this program contains two lamps (or one lamp, but with 2 filaments) which are operated subsequently, that means first one ro several test functions are executed with one lamp (or one filament) then one or more test functions are executed with the other lamp (or other filament).

Nominal flux lamp 1: The nominal luminous flux (catalogue value) of the first lamp (or filament) as given by the lamps manufacturer or by legal requirement.

Nominal flux lamp 2: The nominal luminous flux (catalogue value) of the second lamp (or filament) as given by the lamps manufacturer or by legal requirement.

Last function with lamp 1: For a two-lamp-test the last function, which is executed with the first lamp (or filament) burning. The following functions after the selected function are measured with the second lamp (or filament)

Program control

This section defines general parameters and condition for the test program

All measurements in unit 1: If checked, all functions are measured with values in the first unit (e.g. lx). The function editor does not allow the selection of another unit

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All measurements in unit 2: If checked, all functions are measured with values in the second unit (e.g. cd). The function editor does not allow the selection of another unit. If neither unit1 or unit 2 is checked, you can select and use different units for different functions

Allow reaiming: If checked, each measurement function allows a reaiming

Save any distribution: If checked, functions which measure light distributions in zones or on lines can be edited to save the measured light distribution into the database, so that graphical evaluations or zonal flux calculations can be made.

Print NOK mark on protocol: if checked, the test protocol contains NNNNOK (Not-O.K.-Marks) to indicate that the measured value is outside of the requirement

Pause after each function: If checked, the program stops **after** each function measurement and waits for an action of the user to continue

Pause before each function: If checked, the program stops **before** each function measurement and waits for a certain period of time. Waiting periods have to be defined in a special section of the program options or can be modified before or during program execution

Use Min/Max values: If checked, Each function can be edited with a minimum or maximum requirement, which has to be fulfilled in the measurement of this function

Use Fmin/Fmax values: If checked, additional requirements than the primary requirements can be entered, and indicated by a different NOK-mark if the value measured by the function is outside these requirements

Use special function Min/Max: If checked, the user can enter a relative requirement, related to the measurement value of another function

Use zonal (group) evaluation: If checked, the user can enter zonal (group) requirements, which are checked, if the individual requirement of a test point is not fulfilled (e.g. used in SAE signal lamp tests)

Measuring device

This section lists the possible measuring devices for the test program

Program functions

The program functions contains the list of test functions of the test program.

Edit programs – input of program functions

List of functions: A list of the available test functions suitable for this test program

Functions list: The list of the actual selected functions for this test program either listed as description or printed text

Add: Adds the selected function from the list of function to the function list of the test program

Change: Changes the actual selected function from the Function list into the function selected in the List of functions

Insert: Inserts the actual selected function from the function list behind the function selected in the List of functions

Delete: Deletes the function selected in the List of functions

Move up: Moves the function selected in the List of functions one position up

Move down: Moves the function selected in the List of functions one position down

Description: Displays the function descriptions of the selected functions in the List of functions

Printed text: Displays the function printed text of the selected functions in the List of functions

Function editor

Description: Per default when a new function is edited, the function name is used as the description and the printed text. The description is used in the computer screen display of functions

Printed text: The printed text is used in printings of protocols to the Windows printer

Minimum/Maximum: The requirement given in a regulation. A measured value is checked whether it exceeds the minimum or maximum values and, if pre-selected, a NOK-mark is printed on a protocol.

Min text/Max text: The text printed into the Minimum/Maximum columns of test protocols. Per default this is the same text as in the Minimum/Maximum fields, but can be changed. If the button with the "<" sign is clicked, the text in the Minimum or Maximum field is copied into the corresponding Min text or Max text field.

At H[°]: The angular position of the measurement at the horizontal measurement angle H in deg.

At V[°]: The angular position of the measurement at the vertikal measurement angle V in deg.

From H[°]: The horizontal start position of a scan

To H[°]: The horizontal end position of a scan

Step H[°]: The horizontal step angle of a scan

From V[°]: The vertical start position of a scan

To V[°]: The vertical end position of a scan

Step V[°]: The vertical step angle of a scan

Unit: The measurement unit in lx, cd, cd/m^2

Min > as: A requirement minimum which is depending on the measurement result of another function. The value to be entered in this field is a factor

Min < as: A requirement minimum which is depending on the measurement result of another function. The value to be entered in this field is a factor

X Value of: The function to which the Min > as or Max < as factor points has to be selected from the list of functions . The special function minimum or maximum is calculated as factor (value in the Min > as or Max < as field) multiplied by the value to be measured in a test by the function shown in the field x Value of.

F1min, F2min, F3min, F1max,F2max,F3,max: Additional requirement values for minimum or maximum. Only visible if the field Use special function Min/Max in the Program control section has been checked. Allows the NOK-marks for these values to be displayed in a test protocol, if the measured value exceeds one of these values.

Add: When clicked, the just edited functions is added to the Function list of the test program

Accept: When clicked, the just edited function replaces the parameters of the selected function in the Function list

Cancel: Cancels the function editing. The values are not used.

Extended functions

The LIMES program allows to perform distribution measurements (scans) not only in equal or equidistant steps, but also non uniform steps are allowed.
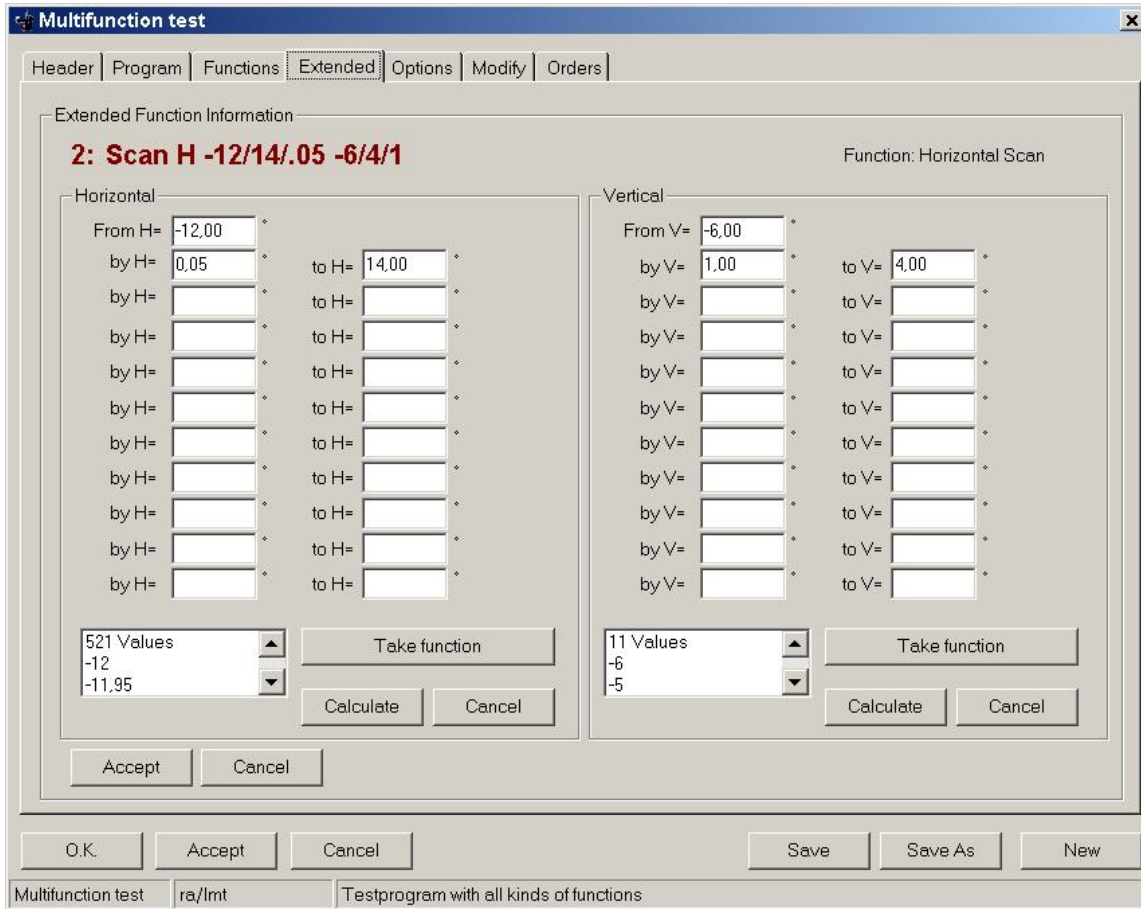
Edit programs – input of extended steps

If a scan function has been selected in the function editor, a new tab with the title "Extended" appears.

Horizontal: Extended horizontal steps are entering in the order From H … by H … to H … by H … to H etc.

Vertical: Extended vertical steps are entering in the order From V … by V … to V … by V … to V etc.

The entered values must be reasonable, that means the steps which you enter must be different from Zero, match the angular resolution of your goniometer, and allow the list to be complete.

Take function: Takes the Start-, End-, and Step-angles defined on the functions section for this function and puts it into the first input fields. This also clears al other values, if extended steps have been entered and shall be completely taken away.

Calculate: Calculates the list of angles to be measured from the extended steps. Allows a simple way to check whether the entered values are reasonable

Accept: Accepts all inputs and continues

Cancel: Cancels this page and throws away all modifications

Program options

This section allows the pre-selection of program flow and display grids for the test program.

Program flow

This section lists the default program flow (instruction for the order and functions of execution). Each item which is checked in the list is executed.

Use program flow: The use of program flow can be switched on and off

> *Note:*
> *More information about the program flow concept can be found in the general section of the LMT LIMES 2000 operation manual*

Program flow concept

Grids

This section defines the default grid parameters for display function lists of this program in tables displayed on the computer screen during program selection, evaluation, program execution, and for printed reports.

> *Note:*
> *Grids for display and printing can be changed as a definition for the test data which uses this program as well as during execution or evaluation*

Program zones

The program zones allow the general editing of zones (groups). Zones or groups are often defined as requirements in some standards, e. g. in the SAE stop lamp test. Zone evaluation means that if a single point does not fulfill the requirement given for this point, the LIMES program checks, if a certain group of functions together fulfill the so-called zonal requirement. This is usually the sum of the individual

requirements of the individual function belonging to the group, but the LIMES program allows the user to specify individual values for these requirements.
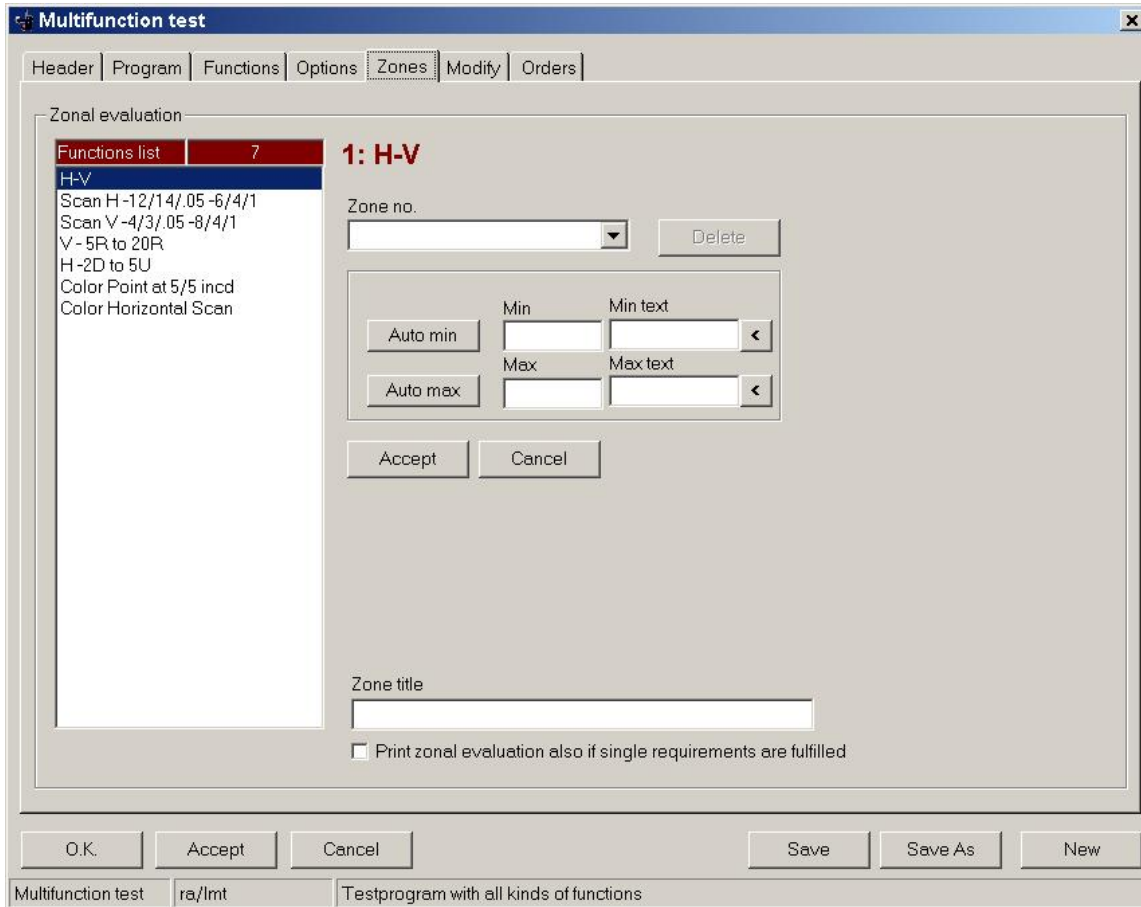
Edit programs – input of zones

Zonal evaluation

Zonal evaluation is only visible if the corresponding item Use zonal (group) evaluation is checked in the Program control section

Zonal evaluation: The list of the available functions is displayed. To select a function to which you want to edit zones click onto a function in the list

Zone number: Enter a new zone number of select an existing one, to which you want to assign the selected test point

Min/Max: The requirement given in a regulation for the zone. The measured values of all functions of the zone are added, and the result is checked whether it exceeds these minimum or maximum values and, if pre-selected, a NOK-mark is printed on a protocol.

Min text/Max text: The text printed into the Minimum/Maximum columns of test protocols. Per default this is the same text as in the Min/Max fields, but can be changed. If the button with the "<" sign is clicked, the text in the Minimum or Maximum field is copied into the corresponding Min text or Max text field.

Auto min: Clicking on this button calculates the required minimum value by summing up the original minimum values for each function of the selected zone.

Auto max: Clicking on this button calculates the required maximum value by summing up the original maximum values for each function of the selected zone.

Delete: Deletes the actual zone number

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Accept: This button has to be clicked, if the min or max values edited before shall be taken into the program

Cancel: If this button is clicked, the edited values are not taken into the program

Zone title: The title of the zone which is displayed or printed in the test protocol

Print zonal evaluation also if single requirements are fulfilled: In the SAE regulation zone evaluation is only required if one of the single values for the function of a zone is not fulfilled. If this box is checked, the zone evaluation is performed and the results are printed on the protocol

Modify program

Instead of editing the individual functions the Modify program section can be used. With this function it is not possible to add, delete or replace program functions, but to modify already entered characteristics in a more simple way.

Function	#	Display text	Printed text	Min Value	Min text	Max Value	Max text	H1	H2
H-V	1	H-V	H-V	3	3	4	4	0,00	
Scan H -12/14/.05 -6/	2	Scan H -12/14/.05 -6/	Scan H -12/14/.05 -6/	0	0	0	0	-12,00	14,00
Scan V -4/3/.05 -8/4/	3	Scan V -4/3/.05 -8/4/	Scan V -4/3/.05 -8/4/	0	0	0	0	-8,00	4,00
V - 5R to 20R	4	V - 5R to 20R	V - 5R to 20R	100	100	2000	2000	5,00	29,00
H -2D to 5U	5	H -2D to 5U	H -2D to 5U	0	-	1000	1000	0,00	
Color Point at 5/5 incd	6	Color Point at 5/5 incd	Color Point at 5/5 incd	0	-	0	-	5,00	
Color Horizontal Scan	7	Color Horizontal Scan	Color Horizontal Scan	3000	3000	4000	4000	-5,00	5,00

Tabs: Header | Program | Functions | Options | Modify | Orders

Accept   Cancel

To modify data click onto a field in the table where you want to change something. Enter the new data and continue by either clicking on another field, or pressing the enter key or the arrow keys up and down on the keyboard. If a field has been modified, it appears in a slightly different color.

After modification you have to accept or to cancel the changes before you can continue.

It is recommended to use this function in this cases:

- ❑ Min- or max-values of a test program shall be changed only
- ❑ Translation of function descriptions
- ❑ Checking programs for typing errors

Order functions

This section allows to change the order of functions in a test program. For printing functions can be excluded in the table, so that even if a measurement of the function was done, it does not appear in the test protocol.
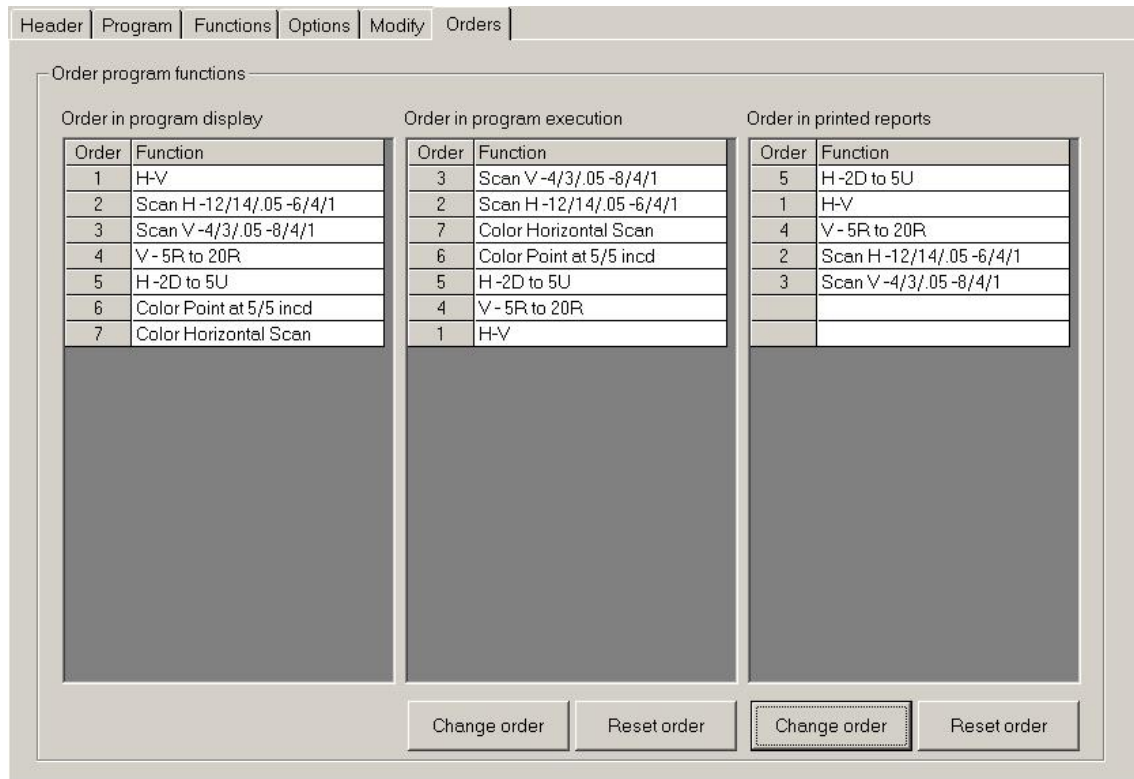
Order in program display: This is the order in which the program has been created. This order can only be changed by using the Move-up or Move-down buttons in the Edit function section.

Order in program execution: A program can be executed with functions in a different order than the one which was created. Functions cannot be excluded from execution.

Order in printed reports: A program can be listed in a test protocol with functions in a different order than the one which was created. Functions can be excluded from execution.

To order functions click on the Change order button.

To reset the order to the order in program display press the Reset button.

The order function window allows to change the order by using the drag and drop method.

Order	Function	Original
1	H-V	H-V
2	Scan H -12/14/.05 -6/4/1	Scan H -12/14/.05 -6/4/1
3	Scan V -4/3/.05 -8/4/1	Scan V -4/3/.05 -8/4/1
4	V - 5R to 20R	V - 5R to 20R
5	H -2D to 5U	H -2D to 5U
6	Color Point at 5/5 incd	Color Point at 5/5 incd
7	Color Horizontal Scan	Color Horizontal Scan
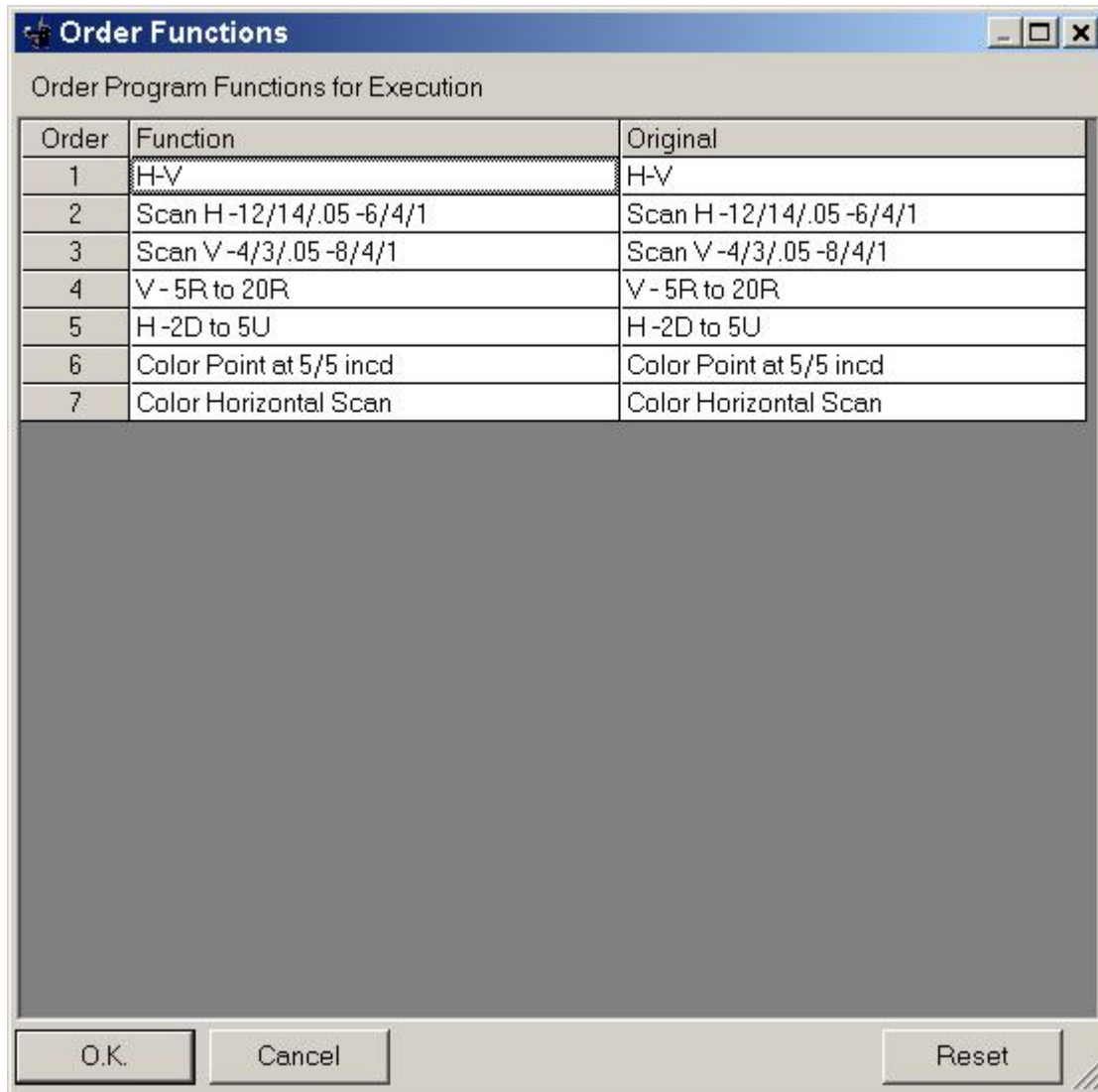
Order functions window

The lists displayed have the following meaning:

❑ Order: Original order number of program as created

❑ Functions: the list of functions to be changed

❑ Original: The original list for comparison

To change the order press the left mouse key over an item in the Function list. The mouse cursor changes into a hand. Hold down the mouse key and drag the field in the list to a position in the same table where you want to have it and release (drop) the mouse key.

To exclude a function in the list drag the function out of the table and drop it on the original list. The function disappears in the left table and appears in the original table in a different color.

To include an excluded function drag the function from the original into an empty space of the function list and drop it. Then move it to a position where you want to have it

Note:
You cannot exclude functions from program execution

Edit program (General lighting)

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to modify the actual test program in the computers memory or create a new test program.

The editing of test programs can be started from the main menu Program or from the program database window.

Edit program header

This section allows the editing of general data of the test program.
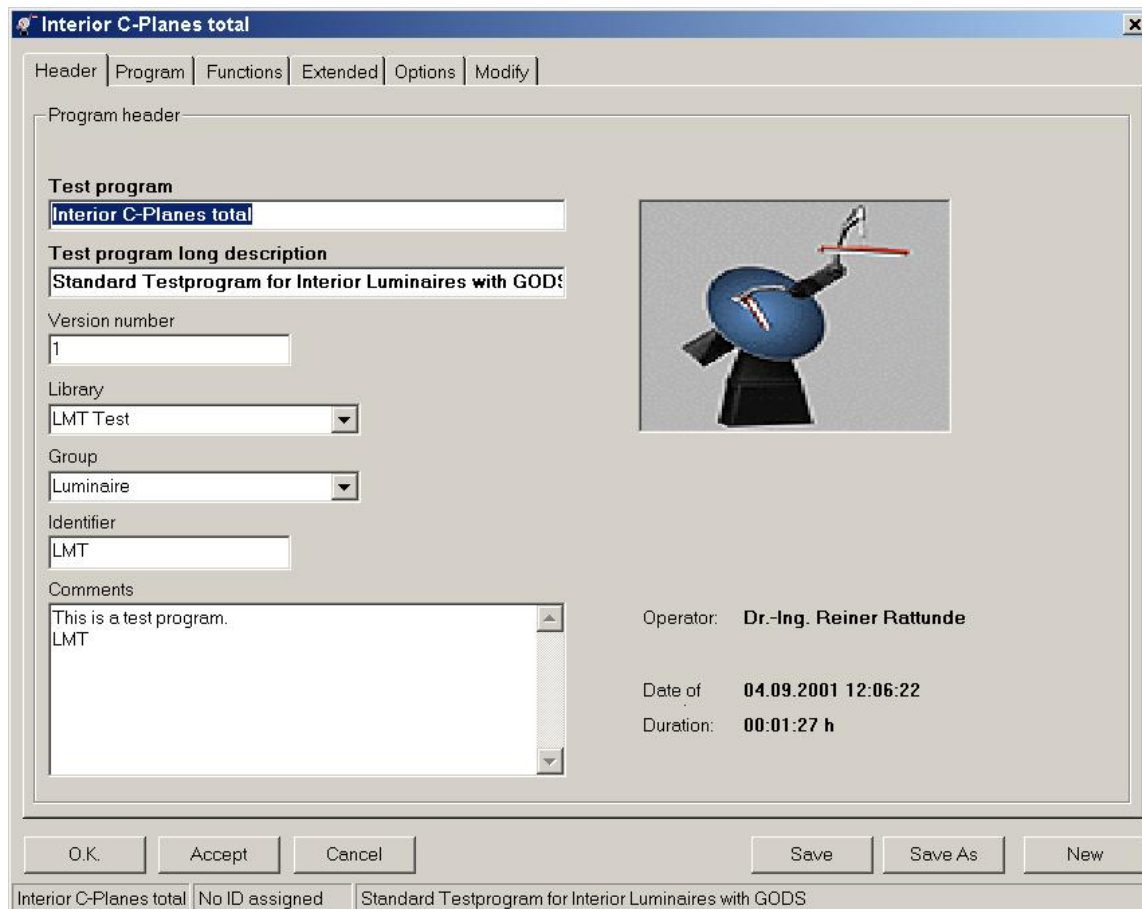
Edit programs – input of header data

Test program: The name of the test program. Used per default for selecting from the database

Test program long description: Long description of the test program name

Version number: Should give specific information about the version of the test program

Library: Should indicate the related program library or collection, e.g. C-planes, integrations, etc.

Group: Should indicate the group of devices test with this program, e.g. interior, road luminiares, floodlights, etc.

Identifier: Name of the author of the test program

Comments: Related information about purpose etc,

Operator: Name of the actual user as logged into LMT LIMES software

Date of creation: Date of creation of test program (resp. modification)

Duration: Period of time required to execute this program. Can only be stated if at least one measurement with this program was executed

Save: Saves the test program back into the program database. If no major modifications have been made, the new test program replaces the existing one even if the name was changed. If major modifications were made, the existing program cannot be replaced if it is used by a test sample data set. To avoid 2 programs with the same name, it is recommended to change the name.

Save As: Saves the test program as a new program into the test program database. You should have entered a new name to avoid 2 programs with the same name in the database.

New: Clears all entries in this window, and allows the creation of a new program

Major modifications: All modifications to a test program which are significant for the test, e.g.

- ❏ Different number of test functions
- ❏ Different order of test functions
- ❏ Different functions
- ❏ etc.

Minor modifications: No restrictions for re-saving test programs into a database while replacing the existing one, e.g.

- ❏ Changing of names, descriptions, or comments
- ❏ Changing of function names
- ❏ Changing of program flow
- ❏ Changing of requirements
- ❏ etc.

Save As. Forces the test program to be saved as a new data set into the database, even if only minor modifications have been done

New: Deletes the entries in the program editor. This item can be used if you want to create a complete new test program

Program

This section allows the modification of general options for the test program.

Edit programs – input of program data

Distributions

Downlight: A light source with only direct light (lower hemisphere)

Uplight: A light source with only indirect light (upper hemisphere)

Total: A light source which emits light into all directions

Down and some up: A light source which emits most of the light downward and has especially no high intensity directly upward (a luminaire with bright sides)

Up and some down: A light source which emits most of the light upward and has especially no high intensity directly downward (a luminaire with bright sides)

Luminaire arm position

Up: The goniometers luminaire arm is in the upper position and allows the mounting of luminaires in a pendant position

Down: The goniometers luminaire arm is in the lower position and allows the mounting of luminaires in a standing position

> *Note:*
> *This oprion is available only for goniophotometers with mirror GO-DS or luminous flux integrators GO-FI*

Program control

This section defines general parameters and condition for the test program

All measurements in cd/klm: If checked, all functions are measured with values in the unit of cd/1000 lm. The function editor does not allow the selection of another unit

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All measurements in cd: If checked, all functions are measured with values in the second unit (e.g. cd). The function editor does not allow the selection of another unit. If neither unit1 or unit 2 is checked, you can select and use different units for different functions

Pause after each function: If checked, the program stops after each function measurement and waits for an action of the user to continue

Pause before each function: If checked, the program stops before each function measurement and waits for a certain time

Measuring device

This section lists the possible measuring devices for the test program

Program functions

This section allows the creation or modification of test program functions.

> *Note:*
> *In general lighting application it is recommended to use only one program function within one test program.*

Edit programs – input of program functions

List of functions: A list of the available test functions suitable for this test program

Functions list: The list of the actual selected functions for this test program either listed as description or printed text

Add: Adds the selected function from the list of function to the function list of the test program

Change: Changes the actual selected function from the Function list into the function selected in the List of functions

Insert: Inserts the actual selected function from the function list behind the function selected in the List of functions

Delete: Deletes the function selected in the List of functions

Move up: Moves the function selected in the List of functions one position up

Move down: Moves the function selected in the List of functions one position down

Description: Displays the function descriptions of the selected functions in the List of functions

Printed text: Displays the function printed text of the selected functions in the List of functions

Function editor

Description: Per default when a new function is edited, the function name is used as the description and the printed text. The description is used in the computer screen display of functions

Printed text: The printed text is used in printings of protocols to the Windows printer

From C[°]: The first C-plane to be measured

To C[°]: The last C-plane to be measured

Step C[°]: The step angle of the C-planes

From G[°]: The first angle Gamma to be measured

To G[°]: The last angle Gamma to be measured

Step G[°]: The step angle of Gamma

Unit: The measurement unit in cd/klm or cd

Add: When clicked, the just edited functions is added to the Function list of the test program

Accept: When clicked, the just edited function replaces the parameters of the selected function in the Function list

Cancel: Cancels the function editing. The values are not used.

Extended program functions

This section allows the input or modification of measurement functions with non-equidistant angular steps.

| Header | Program | Functions | Extended | Options | Modify |

Extended Function Information

1: C-Ebenenmessung

Function: C-Plane measurement

C-Planes

From C=	0,0 °		
by C=	90,0 °	to C=	270,0 °
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°
by C=	°	to C=	°

4 Values
0
90

Take function
Calculate   Cancel

Angles Gamma

From G=	0,0 °		
by G=	5,0 °	to G=	180,0 °
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°
by G=	°	to G=	°

37 Values
0
5

Take function
Calculate   Cancel

Accept   Cancel

Edit programs – input of extended program functions

C-Planes: Extended horizontal steps are entering in the order From C … by C … to C … by C … to C etc.

Angles Gamma: Extended vertical steps are entering in the order From Gamma … by Gamma … to Gamma … by Gamma … to Gamma etc.

The entered values must be reasonable, that means the steps which you enter must be different from Zero, match the angular resolution of your goniometer, and allow the list to be complete.

Take function: Takes the Start-, End-, and Step-angles defined on the functions section for this function and puts it into the first input fields. This also clears al other values, if extended steps have been entered and shall be completely taken away.

Calculate: Calculates the list of angles to be measured from the extended steps. Allows a simple way to check whether the entered values are reasonable

Accept: Accepts all inputs and continues

Cancel: Cancels this page and throws away all modifications

Program options

This section allows the user to enter more special options for the test program.
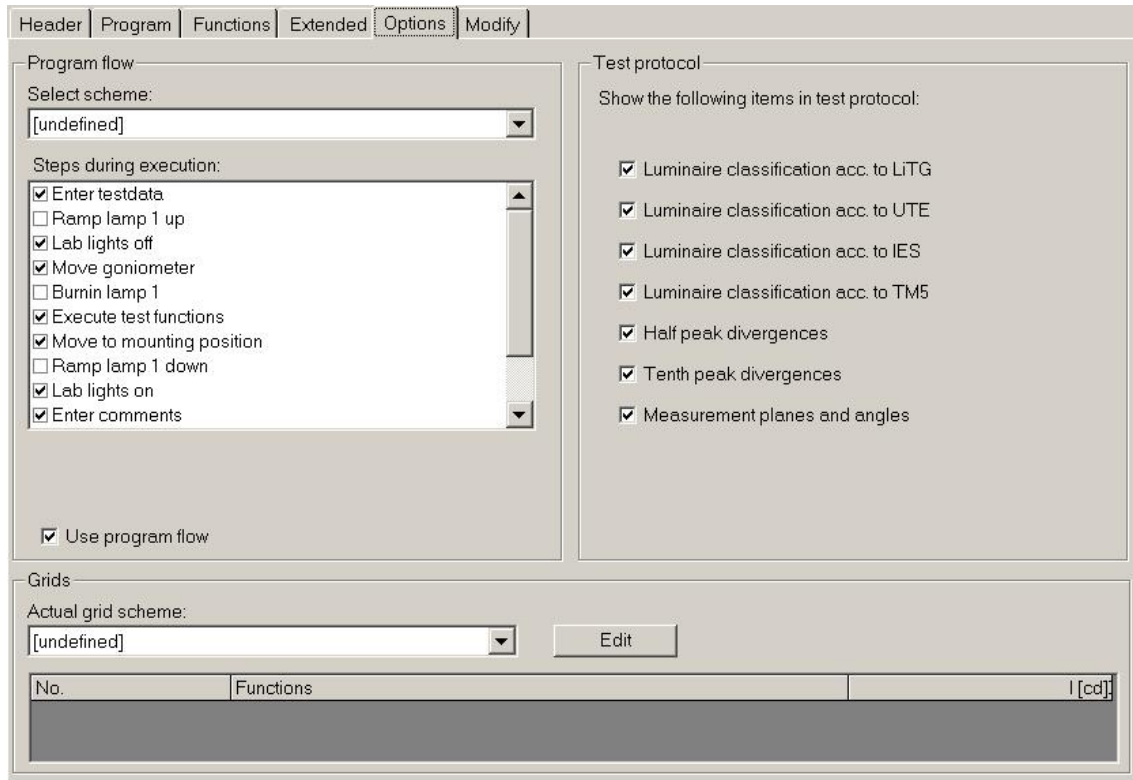
Edit programs – special options

Program flow

This section lists the default program flow (instruction for the order and functions of execution). Each item which is checked in the list is executed.

Use program flow: The use of program flow can be switched on and off

> *Note:*
>
> *More information about the program flow concept can be found in the general section of the LMT LIMES 2000 operation manual*

▢ Program flow concept

Grids

This section defines the default grid parameters for display function lists of this program in tables displayed on the computer screen during program selection, evaluation, program execution, and for printed reports.

> *Note:*
> *Grids for display and printing can be changed as a definition for the test data which uses this program as well as during execution or evaluation*

Test protocol

The marked items will be displayed below the luminaire data descriptions in the test protocol.

Modify program

Instead of editing the individual functions the Modify program section can be used. With this function it is not possible to add, delete or replace program functions, but to modify already entered characteristics in a more simple way.

Function	#	Display text	Printed text	C1	C2	C3	G1	G2	G3
C-Ebenenmessung	1	C-Ebenenmessung	C-Ebenenmessung	0,0	270,0	90,0	0,0	180,0	5,0

Edit program – Modify function

To modify data click onto a field in the table where you want to change something. Enter the new data and continue by either clicking on another field, or pressing the enter key or the arrow keys up and down on the keyboard. If a field has been modified, it appears in a slightly different color.

After modification you have to accept or to cancel the changes before you can continue.

It is recommended to use this function in this cases:

❑ Step angles of a test program shall be changed only

❑ Translation of function descriptions

❑ Checking programs for typing errors

Execute test program

This item is a submenu item of the program menu of the Limes Main Menu.

This item is used to execute the actual test program associated with the actual test sample data in the computers memory.

> *Note:*
> *A valid test program must be available.*
> *Before a test program can be executed, a test program with at least one test function has to be available in the computers memory. For this you have either to select a test program from the user database, or load a test sample data set from the test sample database with a valid test program associated with it, or have created a new test program. See also Open program or Edit program*

> *Note:*
> *Valid test sample data should be available.*
> *Before a test program can be executed, you should check whether the actual test sample data within the computers memory is reasonable, especially if the proper lamp data or test conditions have been selected. See also Edit sample.*

More information about program execution can be found in a separate chapter in this documentation. Click here to get to this chapter.

Save As ...

This item is a submenu item of the file menu of the Limes Main Menu.

This items is used to save the actual test sample data under a new name into the test sample database or to convert the test sample data into an ASCII file in a certain file format

Export files menu

LIMES Database file

If a sample data in the database exists, it can be overwritten by the new data.

LIMES ASCII file (ATF)

The test sample data is saved into a single ASCII text file in the LMT LIMES 2000 ASCII file format to the hard disk. The initial folder is defined int the Main menu, Options, Files and Folders.

The file automatically gets the extension .atf.

> *Note:*
> *The list of file formats above is depending on the options available in your LIMES software*

Execute in source file

This item is a submenu item of the program menu of the Limes Main Menu.

This item is used to execute the actual test program associated with the actual test sample data in a source file, and not by real measurement.

> *Note:*
> *A valid test program must be available.*
> *Before a test program can be executed, a test program with at least one test function has to be available in the computers memory. For this you have either to select a test program from the user database, or load a test sample data set from the test sample database with a valid test program associated with it, or have created a new test program. See also Open program or Edit program*

> *Note:*
> *Valid test sample data should be available.*
> *Before a test program can be executed, you should check whether the actual test sample data within the computers memory is reasonable, especially if the proper lamp data or test conditions have been selected. See also Edit sample.*

More information about program execution in source files can be found in a separate chapter in this documentation. Click here to get to this chapter

Import program from ...

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to import test programs from external files in a recognized format, e.g. LMT program files for former MS-DOS versions.

Execute test program

Execute Program

When a test program has been selected from the test program database, it can be executed. Program execution can be started from the Limes main program menu or from the main tool bar button.

⬜ Execute program for automotive lighting tests

⬜ Execute program for general lighting tests

Execute Program (Automotive lighting)

This chapter describes the execution of test programs for automotive lighting tests.

> *Note:*
> *If a lamp shall be operated (electrical values automatically set with a controllable power supply),*
> *make sure your actual test sample data contain the necessary set values for voltage and current.*

When the program execution starts, a sizable window appears on the screen.
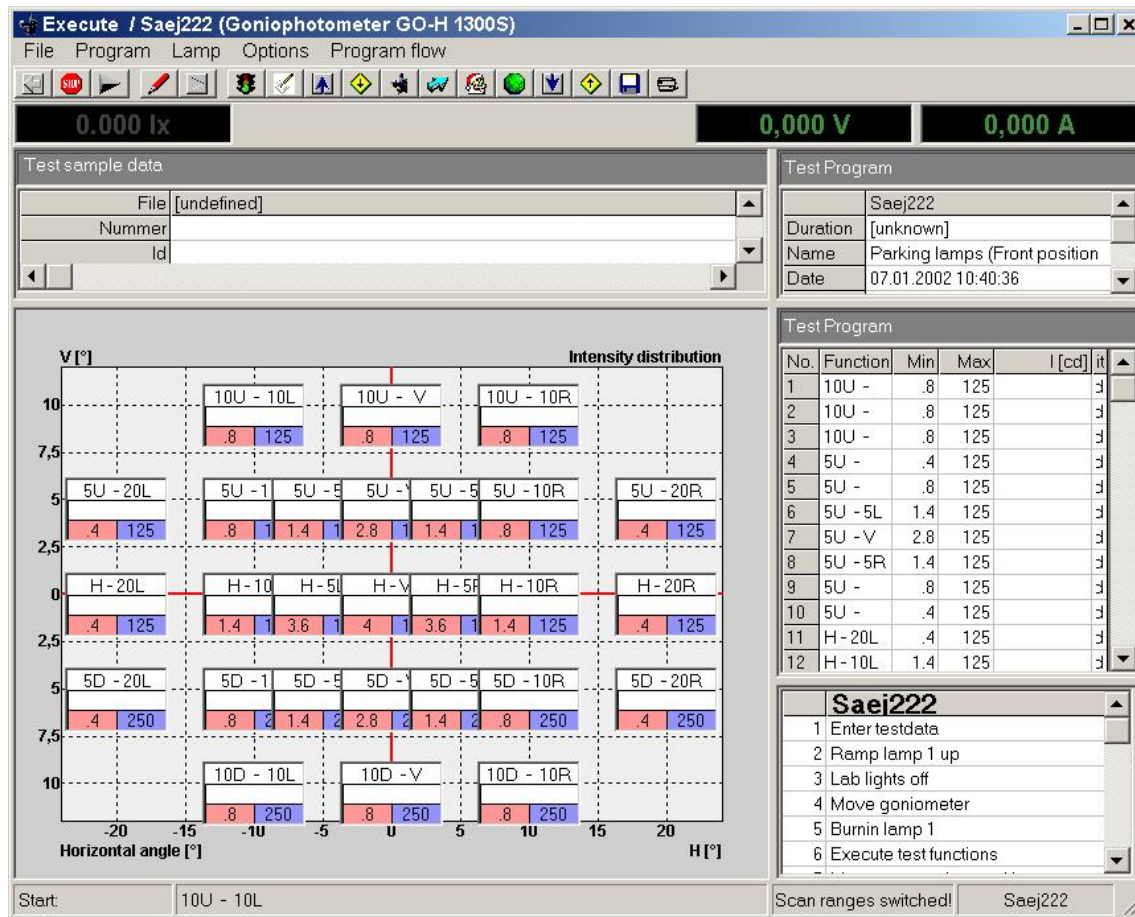
The program execution window is divided into several areas. The size of the areas can be changed by clicking with the left mouse on the border between the areas, holding down the mouse button and move the border either horizontally or vertically. Areas can be hidden by use of the Execute menu.

Switch scan ranges

If the test program contains at least one scan function, and if the test sample data was set to left hand mounting, the LIMES program can automatically switch the horizontal scan range borders, as it is required for signal lamp measurement. A message appears and requires confirmation to switch the ranges as shown.
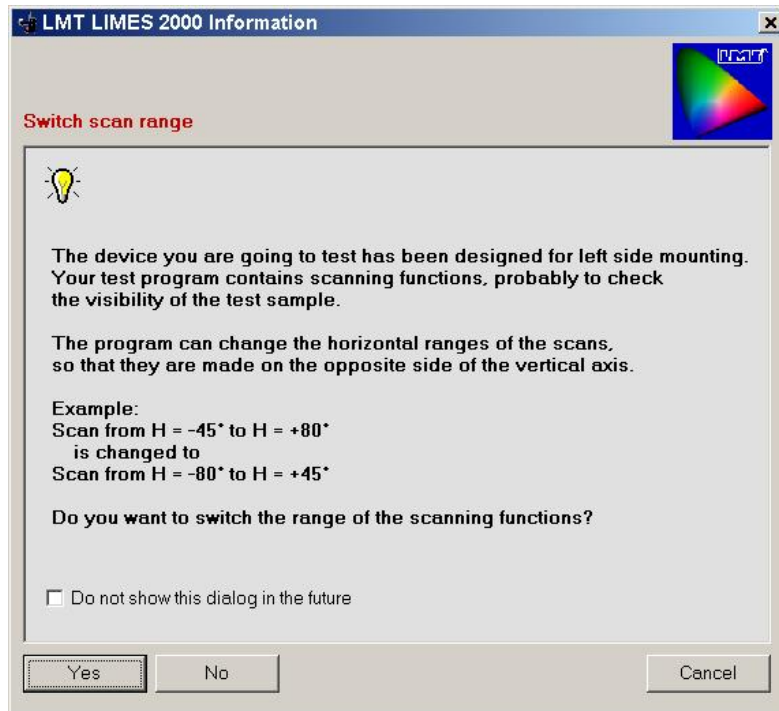
Electrical data inconsistent

If your system contains a controllable power supply, and if you have not entered reasonable electrical values for the set voltage or set current values of the used lamp, a message appears as reminder.
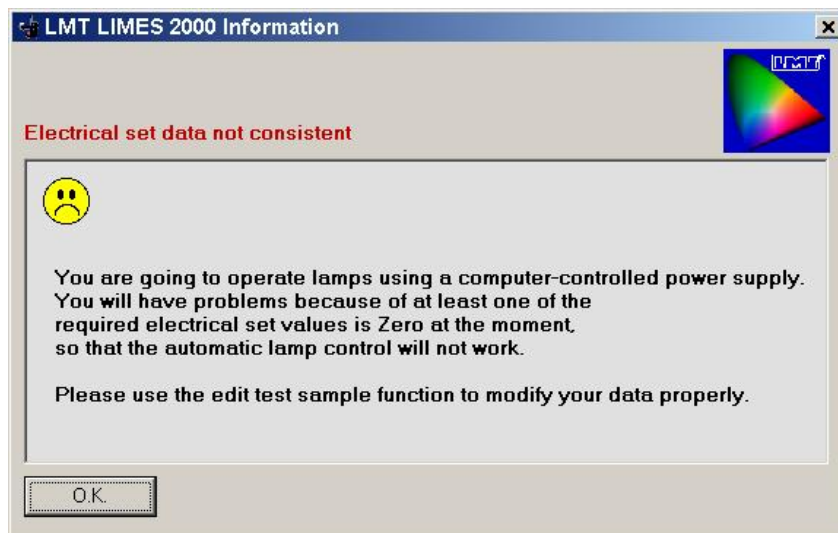
Execute Program (General lighting)

This chapter describes the execution of test programs for general lighting tests.

> *Note:*
> *If a lamp shall be operated (electrical values automatically set with a controllable power supply), make sure your actual test sample data contain the necessary set values for voltage and current.*

When the program execution starts, a sizable window appears on the screen.
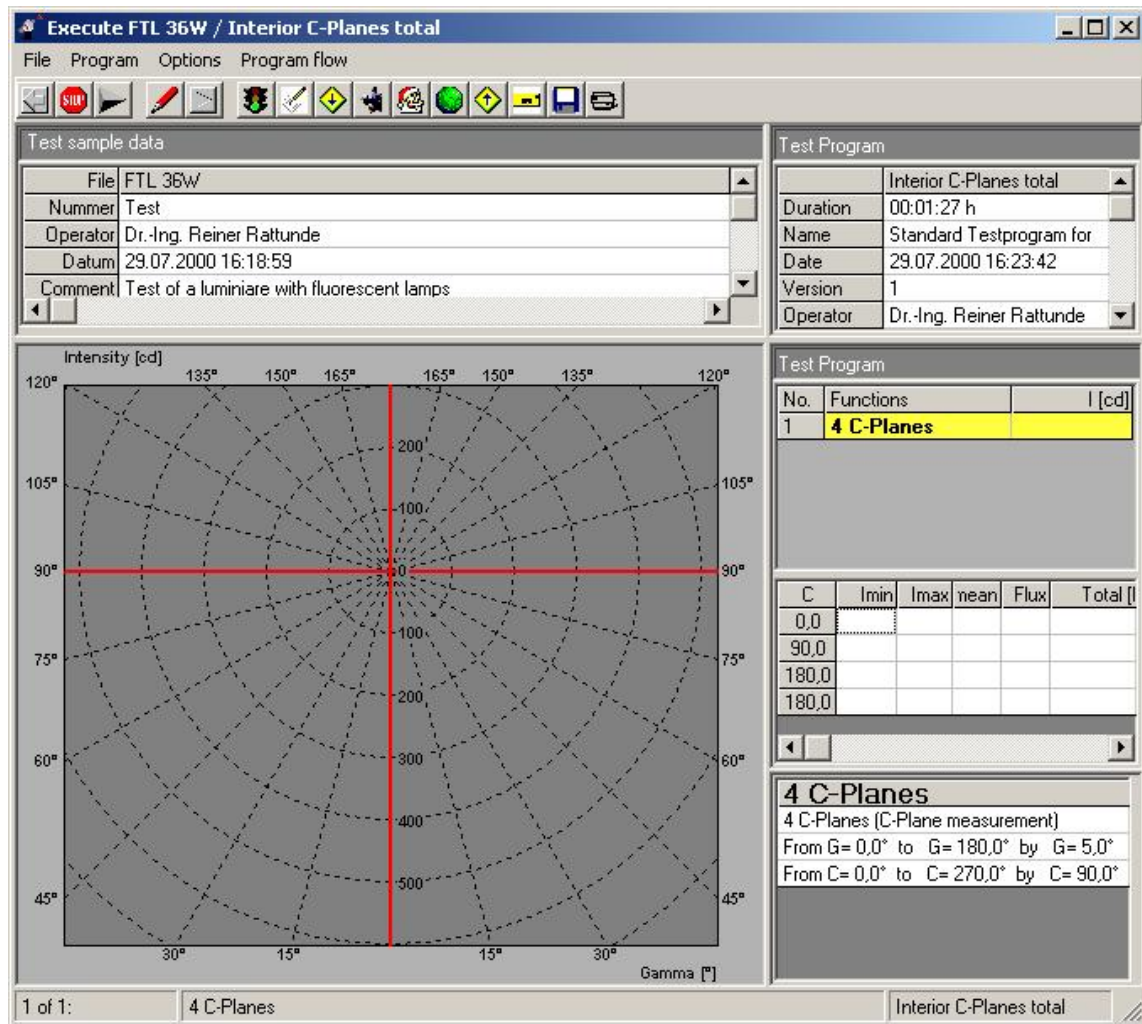
The program execution window is divided into several areas. The size of the areas can be changed by clicking with the left mouse on the border between the areas, holding down the mouse button and move the border either horizontally or vertically. Areas can be hidden by use of the Execute menu.

Execute: Menu

The execute menu appears on top of the execute window. It allows the start and stop of the program execution and the setting and selecting of several options.

The content and function of the execute menu is described below.

File

Use the file menu to access the following menus.

Start: Starts the program execution with the first active step of the program flow

Edit sample: Invokes the edit test sample window

Open Zero file: This menu starts an explorer and allows to load a test sample file from the database which shall act as a Zero-value file

Show Zero values: Displays the actual Zero file values

> *Note:*
> *To get the last two menu items Zeroing during measurement must be enabled in the program options, tab Diverse.*

Save: Saves test sample data to database

Select reports: Select report configuration for printing after measurement (if activated in program flow)

Photometer: Allows the selection of the photometer, if more than one photometer is connected which could perform a measurement (e.g. a goniophotometer and a multiplexer unit)

Cancel: Cancels the measurement. The measurement results are not saved and not taken back to the Limes main program.

End: Terminates the measurement. Accepts the new measured test results and takes them back to the Limes main program.

Program

Use the program menu to show the program submenus. The submenus are made of the list of functions of the test program which can be executed directly.

Lamp

Use the lamp menu to access the following menus.

Read electrical values: Reads the electrical values from the connected power supply or electrical measurement unit. The values are displayed in the top right corner of the execute window.

Ramp up: Ramps the lamp up (applies the electrical values to the lamp)

Ramp down: Ramps the lamp down (sets the electrical values of the lamp to Zero)

Set power supply: Displays the set power supply window.

Aiming: Perform visual aiming for automotive headlamps or check the stability of cutoff.

CCT: Allows the setting of a Computer Controlled Table if available in the system. The table can be moved into any position within the movement range of the table

Lights off: Switches the ambient light off

Lights on: Switches the ambient light off

> *Note:*
> *The lights on and off switching is only available if this option is available in the goniometer setting*

Options

Use the options menu to select the following menus.

Start timer: This invokes the waiting procedure and allows changing of the settings as well as running the waiting procedure

Iso-lines: Displays the iso-lux selection window from the iso-values database

Grids: Allows the setting of grids for the display of the program functions

Show distorted grid: Toggles the display of the grid in the grid area between distorted (non-isometric) and isometric

Show points only: Switches the display of areas (line scans, scans, light distributions) in the grid area on and off

Show test data: Displays or hides the test data area

Show test program: Displays or hides the test program header area

Show grid: Displays or hides the grid area of a scan function

Show test table: Displays or hides the test program function area

Show flux table: Displays or hides the zonal flux table area

> *Note:*
> *Flux tables are only shown if a function is activated which performs a distribution measurement*

Delete results: Deletes available results in the actual test sample data

Program flow

Use the Program flow menu to select the following menus.

Flow: Activates or deactivates the program flow. The name of the actual test program is displayed for this menu

Edit: Allows the editing of the actual program flow associated with the test program

(List of configurations): The submenus consists of the available program flow configurations. Select one of the items to use a different program flow than that one associated with the test program

Zero readings

The following window appears if a Zero file has been selected.

Zero readings from Mutlifunctiontest1		
Attention: These test values are taken as Zero readings and will be substracted automatically from the measurement values if the box at the bottom is checked		

File	Mutlifunctiontest1
Nummer	
Id	
Library	LMT Test
Group	Headlamp

Function	Value
H-V	0,190
Scan H -12/14/.05 -6/4/1	19999,910
Scan V -4/3/.05 -8/4/1	19999,9
V - 5R to 20R	5863,1
H -2D to 5U	19999,5
Color Point at 5/5 incd	498,2
Color Horizontal Scan	0,0

☑ Apply these values to the next measurements

O.K.   Clear

Description: The list on top shows the description of the test data used as Zero file.

Functions: The list below shows the values which are used as Zero-values.

Apply these values to the next measurement: This checkbox is used to activate the Zeroing of values. Zeroing can be deactivated without clearing the data

Clear: Removes the last Zero file from the memory.

Execute: Toolbar

The execute toolbar allows the quick start of a measurement, or to cancel or terminate the program execution. During execution of a test function the toolbar is deactivated.

If y power supply or electrical measurement device is connected, the reading of lamp voltage and current is displayed on the right end of the toolbar.

The electrical display is updated only when required from the program execution. The display turns to red color when activated, and returns into gray color after a while showing that the values are not updated any more.

To see the meaning of a button in the toolbar move the mouse on to the desired button. The meaning is displayed beneath the mouse cursor.

Default buttons are at the left. The meaning is:

- ❑ End execution
- ❑ Cancel execution
- ❑ Start execution
- ❑ Help
- ❑ Activate/inactivate program flow
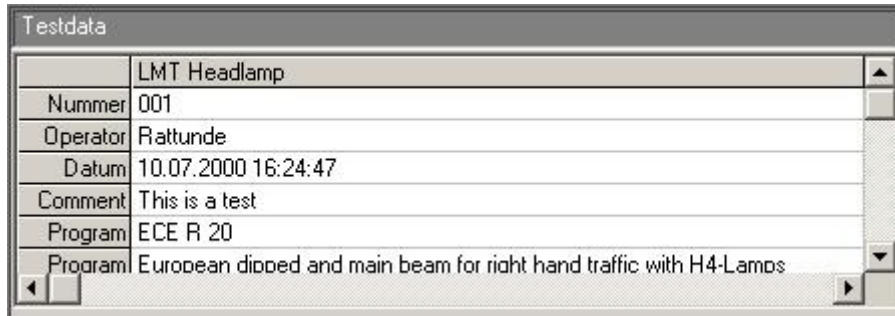
The following buttons are arranged in the order of the program flow. Only enabled functions of the program flow are shown and can be started by clicking on the button.

If program flow is enabled, the program starts and continues automatically at the step associated with the button until the end of the program flow.

If program flow is disabled, clicking on a button only performs the action associated with this button.

Execute: Test sample data area

A list of characteristics of the test sample data is displayed. This window can be switched on or off from the options menu-

	LMT Headlamp
Nummer	001
Operator	Rattunde
Datum	10.07.2000 16:24:47
Comment	This is a test
Program	ECE R 20
Program	European dipped and main beam for right hand traffic with H4-Lamps

Execute: Test program header area

A list of characteristics of the test program header data is displayed. This window can be switched on or off from the options menu-

	ECE R 20
Duration	[unknown]
Name	European dipped and main beam for right hand traffic with H4-Lamps
Date	15.02.2000 12:51:35
Version	ECE Regulation 20
Operator	Rattunde
Id	
Comment	

Execute: Grid area

The grid area displays the measurement grid of the test program in different ways, depending which function is activated in the functions area.

> *Note:*
> *To activate a function click on the function name with the left mouse. The activated function appears in the color of a waiting function (default: yellow) The color can be set in the program options*

Display of grid area:

- ❑ If a point function is activated, the grid covers the whole area covered by points (and zones, if points only is deactivated in the execute options menu)

- ❑ If a scan function is activated, the grid shows the angular range of the scan. Also the scan area appears.
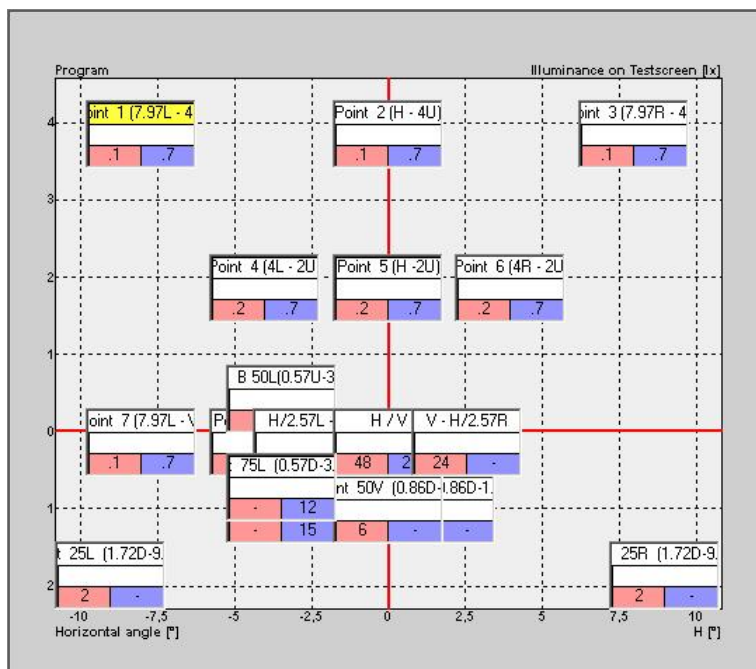
Grid area if a point function is activated
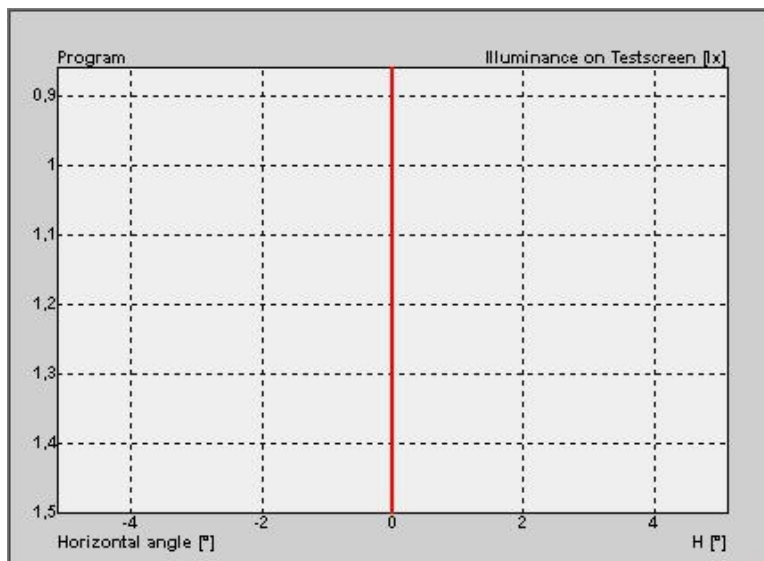
Grid area if a scan function is activated

During a scan, the grid area displays the measured light distribution as a color scale graphic.

> *Note:*
> *Layout of this diagram can be changed in the graphic options settings of the Limes main menu.*

> *Note:*
> *The default diagram for general lighting test program execution is the polar diagram instead of the iso-lux or iso-candela diagram. The scan area diagram is not shown there.*

Execute: Scan area

When a scan function is executed, the results of an individual line scan (horizontal or vertical) are displayed in a diagram.
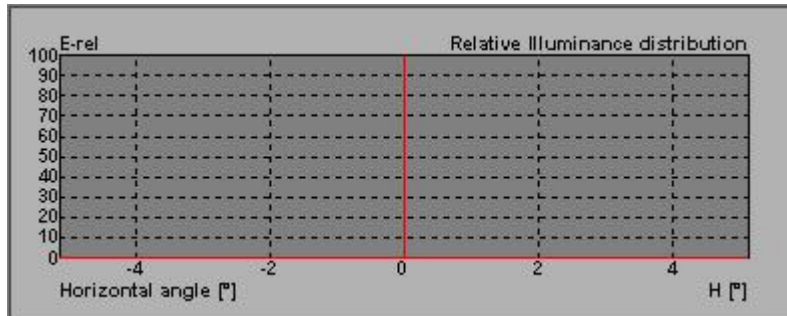
The horizontal scale of this diagram is defined by the range of the line scan, the vertical is a relative scale and ranges from 0 % to 100 %, relating to the maximum within the line scan. The corresponding maximum of the line scan as a photometrical value is displayed on the top left corner of the diagram.

> *Note:*
> *Layout of this diagram can be changed in the graphic options settings of the Limes main menu.*

> *Note:*
> *The default diagram for general lighting test program execution is the polar diagram instead of the iso-lux or iso-candela diagram. The scan area diagram is not shown there.*

Execute: Test functions area

The grid shows the available functions of the test program. The activated function is shown with a certain color (default: yellow) as selected in the Limes program options.

No.	Functions	H[°]	V[°]	E [lx]	O.K.
1	**Point 1 (7.97L - 4U)**	**-7,97**	**4**		
2	Point 2 (H - 4U)	0	4		
3	Point 3 (7.97R - 4U)	7,97	4		
4	Point 4 (4L - 2U)	-4	2		
5	Point 5 (H -2U)	0	2		
6	Point 6 (4R - 2U)	4	2		
7	Point 7 (7.97L - V)	-7,97	0		
8	Point 8 (4L - V)	-4	0		

To **activate** a function click on the functions name

To **measure** a function double click on the functions name

To **change** the width of the columns click on the dividing lines in the header and move the mouse to left or right while holding the mouse button down

To **change** the width of the columns and the layout of this grid permanently use the Limes main menu Options / Configurations / Grid schemes

Execute: Zonal flux area

The zonal flux area displays the measured zonal flux distribution of a scan area in form of tables. The zonal flux area is only visible if a scan function is active.

V	Imin	Imax	Imean	Flux [lm]	Total ▲
0,00					
0,50					
1,00					
1,50					
2,00					
2,50					
3,00					▼

The zonal flux display consists of columns with the following purpose:

Angle H/V: Angular position of the scan (C-Gamma in general lighting)

Imin: Minimum intensity on all angels within the corresponding scan

Imax: Maximum intensity on all angels within the corresponding scan

Imean: Mean intensity on all angels within the corresponding scan

Flux [lm]: The luminous flux within the angular zone (measured from the previous angle to this one)

Total flux [lm]: The luminous flux within the angular zone (measured from the previous angle to this one), accumulated for all previous angles

Rel. zonal flux: The flux value related to the actual lamp flux in %

Rel. flux: The total flux value related to the actual lamp flux in %.

> *Note:*
> *The last value on the bottom of this column will be the light output ratio for this scan. If no lamp flux is given all values in the Rel. zonal and Rel. flux fields will remain Zero*

■ Principles of luminous flux integration

Execute: Function area

The function area on the bottom of the execute window shows the actual active function and its details. If no function is active, which can be made by simply clicking to the headline of the test program list, the program flow of the test program is shown instead.

Show test program flow

Multifunction test	
1	Enter testdata
2	Ramp lamp 1 up
3	Lab lights off
4	Move goniometer
5	Burnin lamp 1
6	Execute test functions
7	Move to mounting position
8	Ramp lamp 1 down
9	Lab lights on
10	Save testdata
11	Print report

Show function

Zone I (2 x E50R)
Zone I (2 x E50R) (Horizontal Scan)
From H= 9,00° to H= -9,00° by H= 0,25°
From V= -9,00° to V= -1,50° by V= 1,50°

When executing, a **Stop** button is displayed. To cancel a running measurement click on this button. The actual function is finished and the termination stops. The program execution can be continued.

To status bars show the actual status of the program execution (status of functions). The upper bar shows the relative success according to the number of functions, the lower according to the passed time in relation to the maximum time needed for execution of this program as it was used last time.

Execute in source

Execute in Source File

General

When you execute a test program of a test data file, the program execution is started. The LIMES program connected to the LimesControl program gets the values required from the test program by reading the photometric or colorimetric instruments.

Instead of reading real photometric values, you can perform the acquisition of data also in any available test data file (source data file), which contains results of a former measurement.

It is necessary of course that the source data file contains results which are useful for the test program of your executing file. If the source file contains light distributions, the angular range of the executing program must be within the range of the available data, otherwise no results are returned. It is not necessarily required that the unit of the test are identical. If the source file e.g. contains intensity values (in cd) and the executing program requires illuminance values (in lx), matching results are automatically converted by using the actual test distance.

After executing in a source file the results now available in the executing file can be used as if they have been measured, e.g. saved as a new file, printed or evaluated in graphical or tabular form.

Rules

By execution in a source file the following rules apply:

❑ Only functions which have no results are executed. To delete existing results click on the Delete button

❑ Execution starts in the order as defined for measurement

❑ If the source files contains more than one test function, the execution starts with the first function and ends with the last

❑ If a function is found which matches the specifications of the function which is executed, its results are taken. In this case no further execution in other functions are done.

❑ Scanning functions (light distribution measurements) can be performed only on source functions which contain light distributions as well. Only values which are inside the matching area between these 2 functions are taken.

Preparation

Prepare a test sample file as if you were going to perform a measurement. Enter test sample data, lamp data and select the test program.

Limes Documentation and Manual
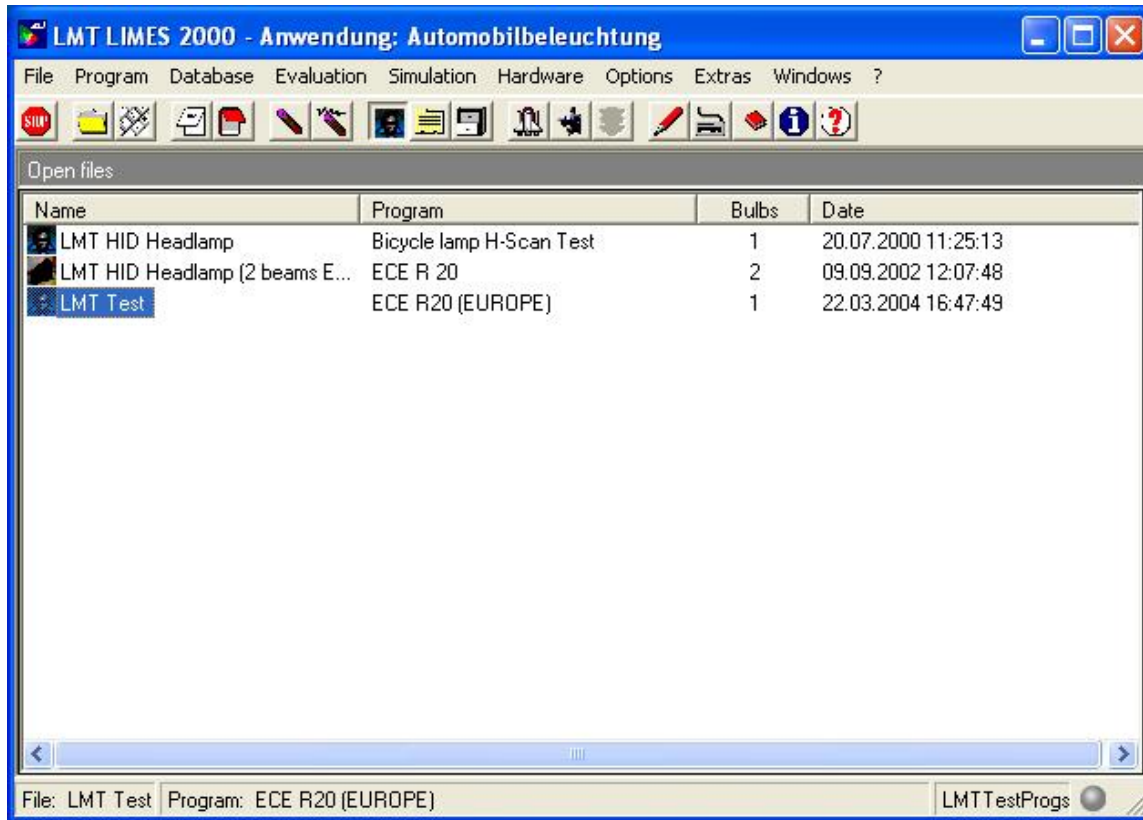
You may also load existing test data files from any LIMES database, or prepare more than on file for execution.

The function Execute in Source File can be called by selecting the LIMES main menu Program, submenu Execute in Source File.

New
Open/Save

Edit

Select execute
Execute

Execute in source file

Import from …   ▶
Export as …

1: ECE R 98 Abblendlicht
2: ECEr98.alr
3: 3-Point and sca test for Signals
4: Bicycle lamp H-Scan Test
5: ECE R 6 Group 1
6: American Test
7: 2 Points with Reaim
8: EuropeanTest
9: C3300 Scantest
10: Allgemeiner Programmtest
11: Saej579
12: 2 Points with Reaim (2 lamps)
13: Cone Surface 2,5
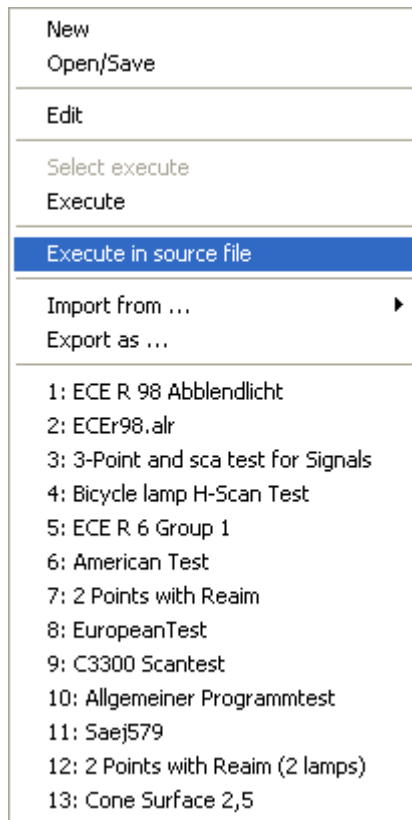
Main Window

The main window is displayed on the screen.
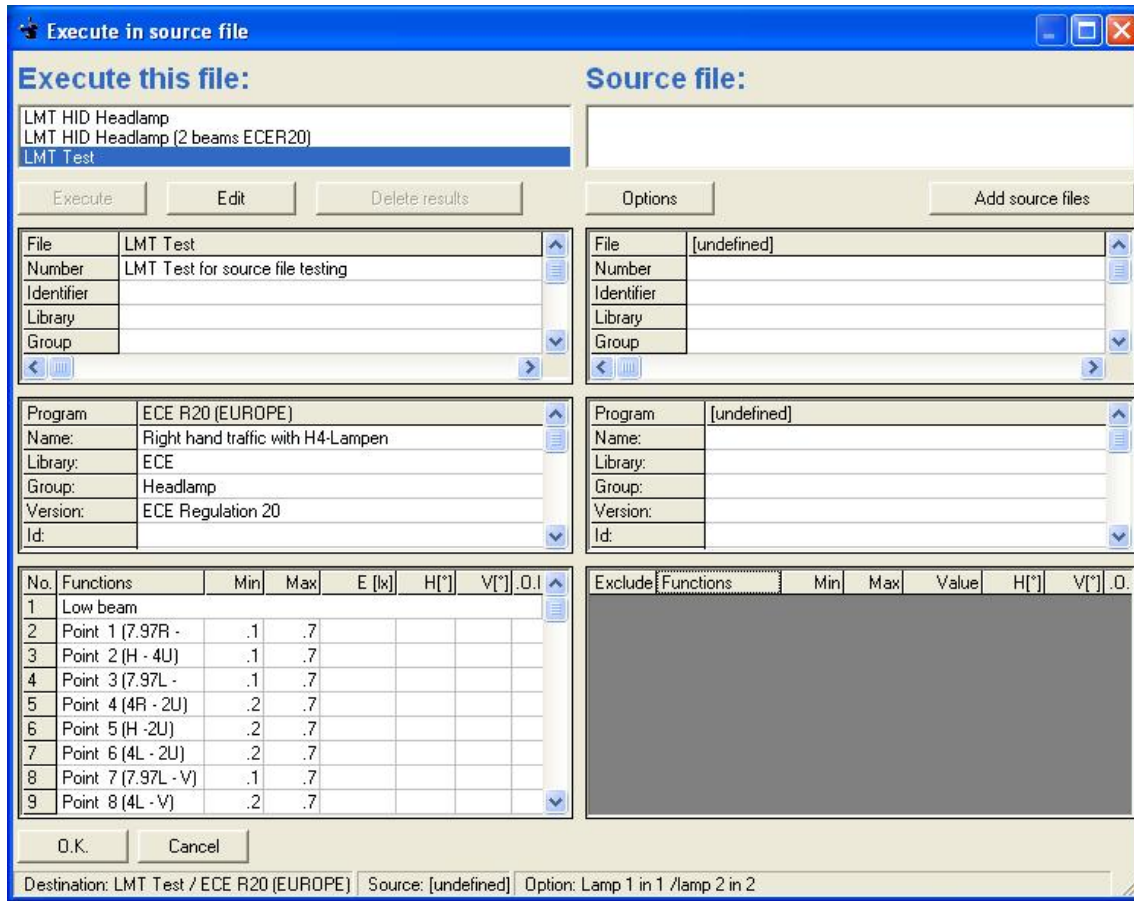
Resize the window:

The main window is divided in several display area. You may resize the height of each area individually, or the corresponding left and right areas together. You may also change the ratio of the widths of the areas as well as the total size of the window.

Move the mouse over the dividing sections between the areas. When the mouse pointer changes, press the left mouse button and drag the dividing area into a new position.
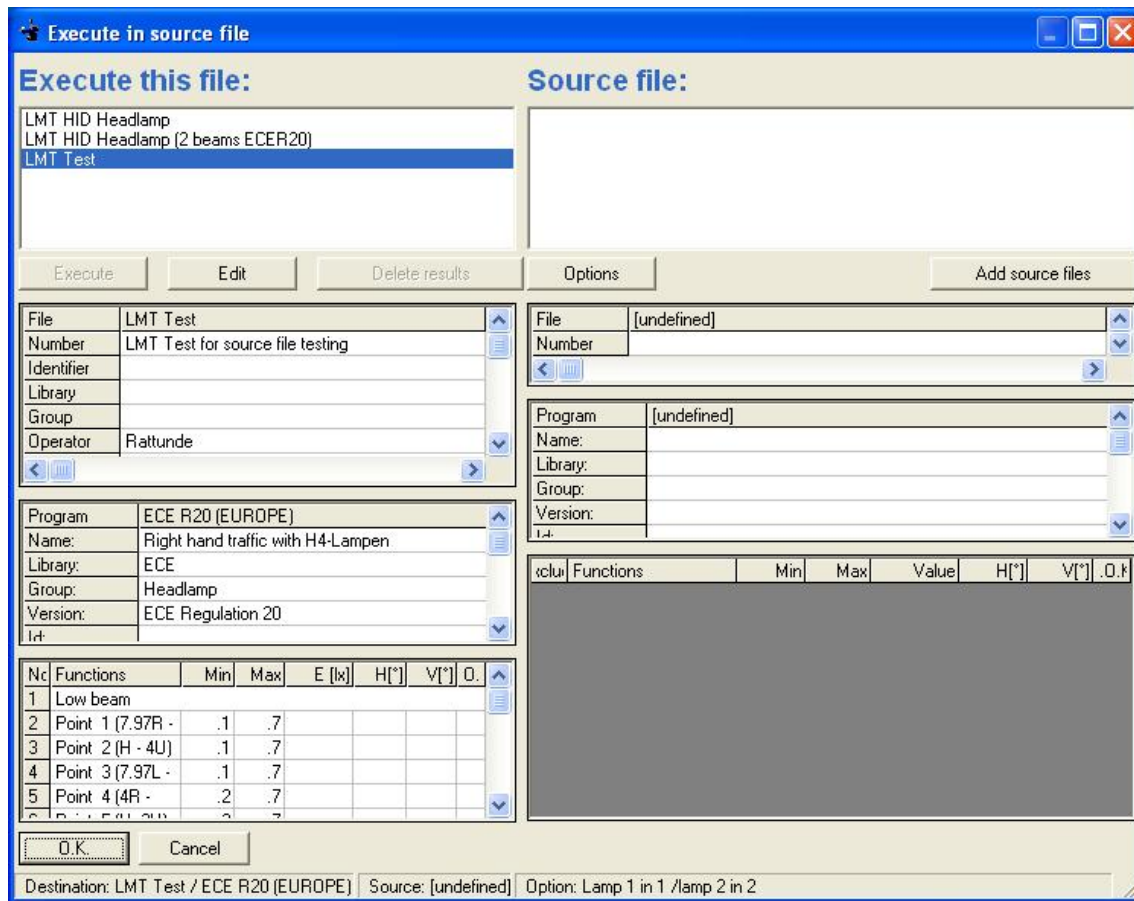
Execute this file:

The list shows the selected files, which you want to execute in the source file. By clicking on a file name the contents of the file are shown in the lists below.

Source file:

The list shows the selected source files, in which you want to do the execution. By clicking on a file name the contents of the file are shown in the lists below. Per default no files are selected. In this case you have to add at least one source file first.

Add source files

You select source files from any test sample database. All selected files appear in the Source file area You can select more than one source file at the same time, or select new source files at any time.

Remove source files

By clicking on a source file name in the Source file list and pressing the delete key on the keyboard the marked source file is removed from the list. You may select more files to be removed at the same time.

A remove source file is not deleted from the database, it only disappears from the list.

Delete results

By clicking on this button you can delete the test results in a test sample file, if available.

Options

A LIMES test program can contain functions which are executed with a different lamp bunring than other functions. The program editor allows to select which function is the last function with lamp 1 in a program with 2 lamps.

If the test is done by executing in a source file, the default action is similar. Functions of lamp 1 of the executing test program are executed in results, which have been created by functions of the first lamp of the source test program. Functions of lamp 2 are executed in results of lamp 2 accordingly.

By selecting the options this behaviour can be changed. Functions of lamp 1 can be executed in results of lamp 2, and functions of lamp 2 in results of lamp 1. All functions can also be executed in functions of lamp 1 or lamp 2 of the source program only.

✔	Lamp 1 in 1 /lamp 2 in 2
	Lamp 1 in 2 /lamp 2 in 1
	in lamp 1 only
	in lamp 2 only
	in lamp 1 and lamp 2
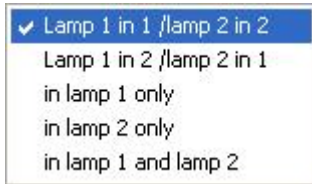
Excluding functions

You can select functions which shall be excluded from being used in the execution by clicking on them in the function list. The selected function appears with colored background as shown, and a cross symbol (X) appears in the first column.

Exclude	Functions	Min	Max	E [lx]	H[°]	V[°]	
	Punkt 1 (7.97L - 4U)	.1	.7	0,402	-7,97	4	
X	Punkt 2 (H - 4U)	.1	.7	0,157	0	4	
X	Punkt 3 (7.97R - 4U)	.1	.7	0,380	7,97	4	
X	Punkt 4 (4L - 2U)	.2	.7	0,571	-4	2	
	Punkt 5 (H -2U)	.2	.7	0,621	0	2	
	Punkt 6 (4R - 2U)	.2	.7	0,512	4	2	
X	Punkt 7 (7.97R - V)	.1	.7	19,217	7,97	0	
	Punkt 8 (4R - V)	.2	.7	18,433	4	0	
	Punkt B 50R(0.57U-:	-	.4	1,396	3,43	0,57	
	Punkt 75L (0.57D.1	12	.	11,645	-1,14	-0,57	

Clicking on the function again clears the function from the list of excluded functions. To clear all functions from the list of excluded function simply click on the name of the source file in the list on top of this window to reload the source file again.

Execute in source file

By clicking on the Execute button the excution starts. The progress is shown on the bottom of the window.
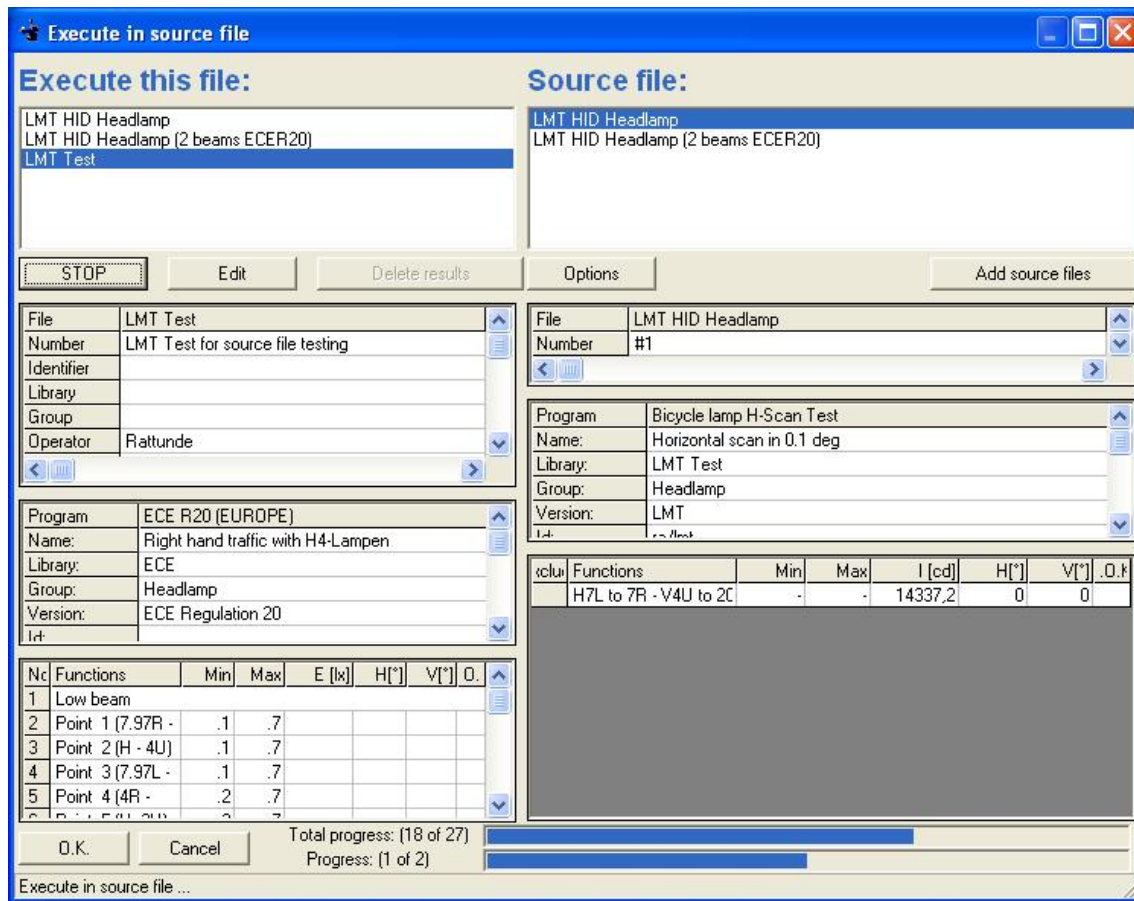
After execution the results appear in the left bottom table.

Terminate

By clicking on the O.K. button the window closes, and all results are taken back to the LIMES main program. You may evaluate or re-save the test files as you want.

By clicking on Cancel al results received in this process are thrown away, the test files remain as they were before clicking on the Execute in source file menu.

> *Note:*
> *The names of the selected source files are saved in the windows registry, the source files (if they still exist) are automatically reloaded the next time you call the Execute in source file function.*

Integrating sphere measurement

Integrating sphere measurement

The LIMES program can be used for measurement with integrating spheres like

- ❑ **UL 1000**
- ❑ **UL 1500**
- ❑ **UL 2000**

The spheres can be equipped with a tristimulous colorimeter for flux and color measurement at the same time.

To allow integrating sphere measurement the necessary hardware module must be available in the software.

Integrating sphere measurements can be executed by using the Integrating Sphere or Luminous Flux menu of the LIMES main menu item Hardware.

> *Note:*
> *If no goniophotometers are defined in the system, integrating sphere measurements can also be started by the Execute program menu or icon of the LIMES main toolbar.*

Procedure

Luminous flux measurement with an integrating sphere is always a relative measurement. This is done by comparison of the measured flux of the test lamp with the measured flux of a standard lamp, which has a known luminous flux certified by some calibration protocol. Luminous flux standard lamps are usually measured by other devices such as goniophotometers, and can be obtained from lamp manufacturers or test houses.

As stated in the relevant document CIE Publication No. 70 "The Measurement of Luminous Flux" the following measurements have to be done

- ❑ Measurement of test lamp flux
- ❑ Measurement of standard lamp flux
- ❑ Measurement of auxiliary lamp with test lamp
- ❑ Measurement of auxiliary lamp with standard lamp

With the LIMES software it is possible to reduce the number or standard lamp measurements, which usually are to be done any time a test lamp is measured, by measuring the standard lamp only once and then simply reloading the standard lamp from the lamp database before doing a measurement on a test lamp. This can be done safely for a longer period. The standard lamp measurement has to be repeated only to keep control of changing effects in the sphere (ageing of inner sphere paint etc.).

The LIMES software also saves the auxiliary lamp measurements, therefore also these measurements with the standard lamp can be used by reloading from the database.

Specifics

The luminous flux measurement with integrating spheres by the LIMES program has the following features:

- ❑ Saving lamp data into the lamp database and making the luminous flux values available for other applications like goniophotometer measurements on luminaires, automotive headlamps, or signal lamps
- ❑ Possibility of recording the luminous flux of the lamp over a long time for checking lamp stability
- ❑ Possibility of recording luminous flux values as a function of temperature over long time
- ❑ Possibility to set the luminous flux of DC operated lamps to a certain value

Setting luminous flux

The setting of luminous flux is performed as follows:

- ❑ Set the lamp to an upper voltage value and measure the luminous flux after a settle time
- ❑ Set the lamp to an lower voltage value and measure the luminous flux after a settle time
- ❑ Calculate the voltage for the desired luminous flux by using the known exponential relation between lamp voltage and luminous flux for incandescent lamps
- ❑ Set the calculated voltage and measure the luminous flux after a settle time

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- ❑ Decrease or increase the voltage, if necessary, by certain voltage increments, wait for a certain adjust time, and read the luminous flux
- ❑ Proceed as before, until the flux deviation between the measured and the desired flux is less then the specified flux tolerance, or until the maximum number of trials have been performed

Observe the following rules:

- ❑ Use a maximum voltage (upper voltage limit) that does not harm the lamp
- ❑ Use a minimum voltage which gives a flux less than the desired flux
- ❑ Use reasonable settle and adjust time, depending on the size of filament (lamp power)
- ❑ Allow a reasonable tolerance for the flux. Think of lamp stability.
- ❑ If you do not have success at the first time, modify the values. Set upper and lower voltages manually, note the fluxes, and try again.

Flux measurement by button control

Click on the buttons on the left side of the window to perform the required actions. Some actions run continuously, like electrical measurement, or flux measurements. These actions can be terminated by clicking on the same button again of on another button.

> *Note:*
> *The functions work with test lamp and with standard lamp, whichever was selected*

Select test lamp or standard lamp

Select test or standard lamp measurement by double clicking on the headline ("Luminous flux measurement", blue background or "Luminous flux calibration", red background). You can also select Measurement or Calibration from the Action menu

Button functions

Select: Select a lamp data set from the lamp database

Edit: Edit the data of the test lamp

Lamp on: Switches or ramps the lamp on

Stabilize: Stabilizes the lamp depending on the settings of the test lamp data

Lamp flux: Continuous measurement of luminous flux of the lamp

Lamp off: Switches or ramps the lamp off

Auxiliary: Measures the luminous flux of the auxiliary lamp

> *Note:*
> *The auxiliary lamp has to be inserted and switched on manually at the UL display unit. Make sure that the test or standard lamp is mounted and not burning*

Save: Save the results to the test lamp database

Print: Prints the luminous flux test report

Exit: Ends the flux measurement

Flux measurement menus

The pull down menus of the integrating sphere measurement window have the following functions:

File menu

New: Clears all values of the actual test lamp

Open: Opens the actual test lamp database

Edit lamp: Modifies the data of the test lamp

Save: Saves the test lamp back into the database

Save As…: Saves the test lamp as a new lamp into the lamp database

Open (Standard): Opens the actual standard lamp database

Edit standard lamp: Modifies the data of the standard lamp

Save (Standard): Saves the standard lamp back into the database

Save As…(Standard) : Saves the standard lamp as a new lamp into the lamp database

Print: Prints the test lamp protocol

Print (Standard): Prints the standard lamp protocol

Exit: Ends the luminous flux measurement

Action menu

Measurement: Performs measurements on test sample lamps

Calibration: Performs measurements on standard lamps

Set flux: Allows the setting of a lamp to a certain luminous flux

> *Note:*
> *This function only works with DC operated lamps*

Reading menu

Lamp flux: Starts the reading of luminous flux of lamps

Aux flux: Starts the reading of luminous flux of auxiliary lamp

Power supply: Invoked the power supply window and allows the electrical setting of the lamp

Electrical: Starts the reading of the electrical values of the lamp

Ramp up: Ramps the lamp up to the nominal set value

Ramp down: Ramps the electrical set value down to zero

> *Note:*
> *Depending on the lamp data the set value can either be voltage or current. The ramping speed is defined with the lamp data as well*

Stabilize: Invokes the lamp stabilization window and allows the automatic burn-in of lamps with checking for luminous flux tolerances

Time function: Invokes the lamp stabilization window and allows the burn-in of lamps without checking for luminous flux tolerances

Options menu

Show menu bar: Displays or hides the menu bar

Show toolbar: Displays or hides the tool bar

Show buttons: Displays or hides the buttons

Note:
When hidden, these controls can be made visible again by using the pull down menu which appears after a right-click into the window

Show calibration lamp: Displays or hides the data of the standard lamp

Show graphic: Displays or hides the diagram area to display the time or temperature function of the measurement

Auto recording: If marked, from the start of flux measurements the values are recorded and can be saved for future graphical evaluation

Cycles: The measurement cycles of luminous flux can be selected for 1 s, 2 s, 5 s, 10 s, 15 s, 30 s, or 1 min

Note:
Longer cycles are useful if you want to perform measurement for long time, e.g. several hours or even days

Delete auxiliary lamp reading: Deletes the actual readings with the auxiliary lamp with the test lamp mounted

Delete auxiliary standard lamp reading: Deletes the actual readings with the auxiliary lamp with the standard lamp mounted

Clear calibration: Deletes the actual calibration (standard) lamp from the memory and takes the flux values "as they are"

Help (?) menu

Invokes the LIMES help

Pull down menu on right mouse click

If you click somewhere in the luminous flux measurement window (not on the diagram) with the right mouse button the following menu items are available:

Show menu bar: Displays or hides the menu bar

Show toolbar: Displays or hides the tool bar

Show buttons: Displays or hides the buttons

Show calibration lamp: Displays or hides the data of the standard lamp

Show graphic: Displays or hides the diagram area to display the time or temperature function of the measurement

If you click into the diagram area with the right mouse window, you can change the time scale of the diagram to the values shown in the menu list, as 1-2-5-10-15-30-60-90 s

Flux measurement toolbar

The flux measurement toolbar shows a row of icons below the menu bar and can be used to control the measurement functions. A short information is displayed if the mouse pointer is moved on top of an icon.

Exit flux measurement: Ends the flux measurement

Measurement of lamp flux: Measures the flux of the test lamp

Calibration of integrating sphere: Measures the flux of the standard lamp

Select lamp: Select a lamp data set from the lamp database

Edit lamp: Edit the data of the test lamp

Ramp lamp on: Switches or ramps the lamp on

Read electrical values: Measures the electrical values of the lamp

Stabilize lamp: Stabilizes the lamp depending on the settings of the test lamp data

Read luminous flux: Continuous measurement of luminous flux of the lamp

Ramp lamp off: Switches or ramps the lamp off

Read auxiliary lamp: Measures the luminous flux of the auxiliary lamp

> *Note:*
> *The auxiliary lamp has to be inserted and switched on manually at the UL display unit. Make sure that the test or standard lamp is mounted and not burning*

Save data: Save the results to the test lamp database

Print report: Prints the luminous flux test report

Show temperature diagram: Changes the diagram to display the flux/temperature diagram

Show time diagram: Changes the diagram to display the flux/time diagram

Show temperature/time diagram: Changes the diagram to display the temperature/time diagram

Flux recording

The LIMES software can record the continuous measurements (depending on the selected cycle, selection done in the Options menu) and save them together with the lamp data into the lamp database.

If **Auto recording** is selected in the Options menu, the recording starts immediately when the luminous flux reading is started. Otherwise click on the **start button** in the recording buttons list (second from left, as in a record player)

If **Auto recording** is not selected in the Options menu, the recording starts by clicking on the **start button** in the recording buttons list (second from left, as in a record player)

To **stop** recording click on the Stop button (left most button, show a stop sign as icon)

The recorded time is shown in the **clock** display

To **reset** the recorded values and the clock to zero, click on the erase button (right most button, show a pencil eraser as icon)

> *Note:*
> *Recorded values are not automatically saved. They are saved only if the test or standard lamp data are saved into the lamp database*

To change the reading **cycle**, use the Cycle setting in the Options menu

Setting luminous flux

For DC operated lamps it is possible to set the luminous flux of the lamp to a certain value. This is done by variation of the lamp voltage by a certain procedure, until the luminous flux reading is close enough to the desired value.

The principle is described in the Photometrical principles in the general section of the LIMES documentation.

Invoke the luminous flux setting be selecting Set flux from the luminous flux windows menu.
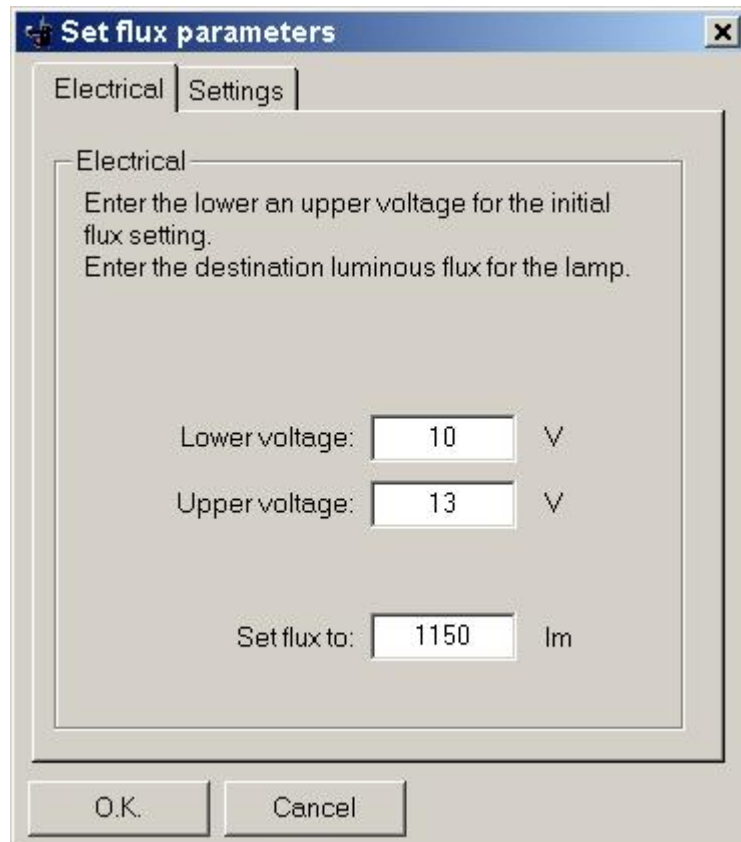
This window requires 3 inputs:

Lower voltage: Enter a lower voltage for the first flux setting, something like 80 % to 90 % of the upper voltage

Upper voltage: Enter the maximum voltage you want to allow for this lamp

Set flux to: Enter the flux value which you want to set in Lumen

> *Note:*
> *The set flux must be emitted from the lamp, if a voltage between lower and upper voltage is applied to the lamp. Otherwise the flux setting will fail*

Options

You can modify the following options to get the best and quickest results.

Lower voltage percentage: Enter a value which gives less than the desired luminous flux

Settle time: Time allowed for the luminous flux to settle after setting lower or upper voltages

Voltage increment: Enter the increment for increasing or decreasing the voltage for fine adjustment of the flux. Take into account the resolution of the power supply

Adjust time: Enter the time allowed for the luminous flux to settle after each voltage increment

Flux tolerance: Give the flux deviation in Lumen for which you would accept the setting

Max. no. of trials: Enter the maximum number to increase or decrease the lamp voltage by the voltage increment before you stop the setting, if you do not get a flux within the tolerance

HeadlampCleaning

Test headlamp cleaning

These are the steps which are necessary to run a test for headlamp cleaning devices according to ECE R45.

> *Note:*
> *We assume that the system was installed properly, all required instruments (goniophotometer, photometers, power supplies etc.) are connected and running, and the test program is available in the test program database. Test sample data and test program data are empty (no files have been loaded or existing information has been cleared by using the New menu in the file and program menus.*

Steps to perform:

- ❑ Start LMT LIMES 2000 program. LimesControl is started as well and connected to the PC which runs the Limes program

- ❑ Edit test sample data. Enter the data of the headlamp and select "Headlamp cleaning" for the type of sample. Load the bulb data from the lamp database

- ❑ Load a test program according to ECER45 from the program database

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❑ Start the program execution

❑ Select "Initial test" from the pull down menu and run the test. Save the results into the database

❑ Apply the standard dirt to the headlamp surface

❑ Start the program execution again

❑ Select "Dirty test" from the pull down menu and run the test. Repeat the test until the results are in the required value range. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Clean the headlamp by using the headlamp cleaning device

❑ Start the program execution again

❑ Select "Clean test" from the pull down menu and run the test. Repeat the test until the results are in the required value range. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Clean the headlamp completely as it was before the initial test

❑ Start the program execution again

❑ Select "Final test" from the pull down menu and run the test. Save the results into the database, select "Overwrite" to overwrite the previous data

❑ Print the report

Edit sample data:

Note:
You can select this type of sample only if you have not loaded any test program, which was written to save any distribution (scan) measured with this program

It is also possible to use for individual files, which can be saved with individual names into the database, for headlamp cleaning evaluation.

Load test program:

Open your program database and select a proper ECER45 test program. If you try to load a test program which was written to save any distribution (scan) measured with this program, you get the following message:

Execute test program:

For ECER45 headlamp cleaning devices you have to perform 4 tests on the same headlamp:

- ❑ Initial test
- ❑ Dirty test
- ❑ Clean test
- ❑ Final test

All tests have to be made with the headlamp adjusted to the exactly same position. You have to use the same bulb running on the same electrical values. If you have to dismount the headlamp for applying the standard dirt or for operating the headlamp cleaning device, make sure that the next test uses the exactly same conditions as the initial test.

You can select the test (initial, dirty, clean, or final) either from the pull down menu or from the pull down box, which appears in the right hand corner of the status bar on the bottom of the screen. Both choices have the same effect.

> *Note:*
> *The menu right to the file menu and the field on the right side of the status bar appear only, if you test sample is of type "Headlamp cleaning"*

It is recommended to turn or report printing for the first 3 tests in the Program flow settings, as the report will be not complete. It is not necessary but recommended to save the data after test. After saving the first initial test each consequent attempts to save require the clicking on the Overwrite button.

Do not change the name of the test sample, always use the same file for the 4 individual tests.

You can perform the 4 tests completely independent, even on different days. Just open the file from the database, which contains one or more parts of the test, and proceed as described above.

When you start the program execution, after your test sample data contains already measured initial test, you will be asked to delete test results before execution:

Always click on the No button, otherwise your previous measured data is lost.

Do not delete the results by using the program execution options menu, as this also will delte all former tests.

> *Note:*
> *If you have saved former tests into the database, you can cancel execution and reload the data, if you happened to delete the results accidentally*

If the message above does not appear, when you have loaded test data which contain results before program execution, enable this message again using the main menus Options / Program / Dialogs.

Show results:

Select "Headlamp cleaning" from the Evaluation menu.

Functions	Initial test	After dirt	Dirty	After cleaning	Cleaned	Final test
			% ... 20%		80%	
HV	4,575	4,617	100,9	4,618	100,8	4,582
50R	4,591	4,600	100,2	4,643	100,5	4,617
50V	4,595	4,572	99,5	4,626	100,4	4,607

Change headlamp cleaning parameters:

Use the Options button of the Show tables for headlamp cleaning window.

You can modify the percentages displayed in this window. These values have been saved in your Windows registry. If you modify these values, the modifications are valid as long as you run this program. To be able to use the modifications in the future, click on "Save as default". To reload default values after making changes, click on "Load default".

Change headlamp cleaning files:

You can use individual test files which have been created without the setting "Type of sample is Headlamp cleaning". You can assign individual files to the 4 test functions of the headlamp cleaning test:

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Note:
You cannot select individual files if you active test data is of type "Headlamp cleaning" as shown in this window

Print test report:

After the final test you are ready to print the report. Select "Headlamp cleaning" from the report list. If you have the preview option on, you will see a similar page:

The table in this page contains all results of the headlamp cleaning test:

Headlamp cleaning ECER45 Test

	Initial test	After dirt	Dirty	After cleaning	Cleaned	Final test
Functions			15% ... 20%		80%	
HV	4,575	4,617	100,9	4,618	100,8	4,582
50R	4,591	4,600	100,2	4,643	100,5	4,617
50V	4,595	4,572	99,5	4,626	100,4	4,607

If the results in the column "After cleaning" are not higher than the required values (80 % of the final test in the example table above), the "Not OK"-marking will apply.

Databases

General

Databases

This item is an menu item of the Limes Main Menu.

This menu item is used to manipulate the various databases used by the LMT LIMES 2000 software, e.g. for lamps, test stands, aiming procedures, isolux values, automobiles, roads, glare diagrams, or color areas.

See also:

▢ Lamps

▢ Iso-values

▢ Stands

▨ Automobiles

▨ Roads

▨ Glare diagrams

▨ Aiming

▨ Color areas

If a new release has been installed (Limes was updated), any database is checked for conformity with the new release. A message is displayed which can be omitted the next database is checked and has to be confirmed by clicking on the O.K. button.
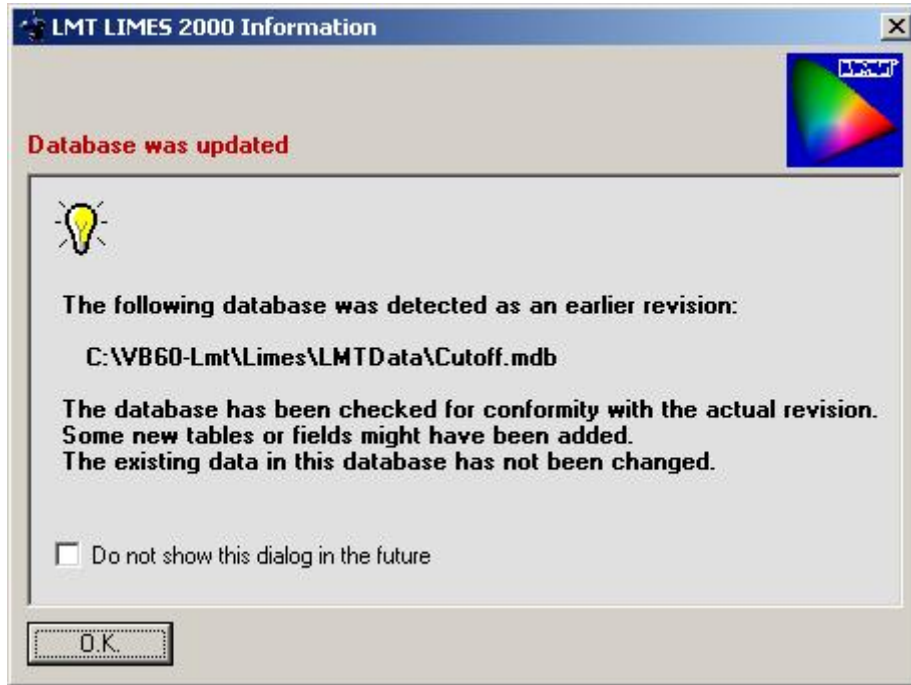
To omit this display the next time click on the check box to activate.

> *Note:*
> *Any release check at a new Limes program start will display this message again.*

Lamp databases

Lamp database

This database can be accessed directly from the main menu item Databases.

The lamp data used in a test sample data set is saved in a lamp database using the Microsoft ACCESS database format. A lamp database can be an individual database or can be also part of a test sample data or test program database. To use the full capabilities of the LIMES program, it is recommended that the default lamp database is also the default test program and test sample database.

> *Note:*
> *To select a database as a standard database use the menu item Files and Folders of the Options menu.*

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After selecting the lamp database from the database menu, the lamp database window appears on the screen.
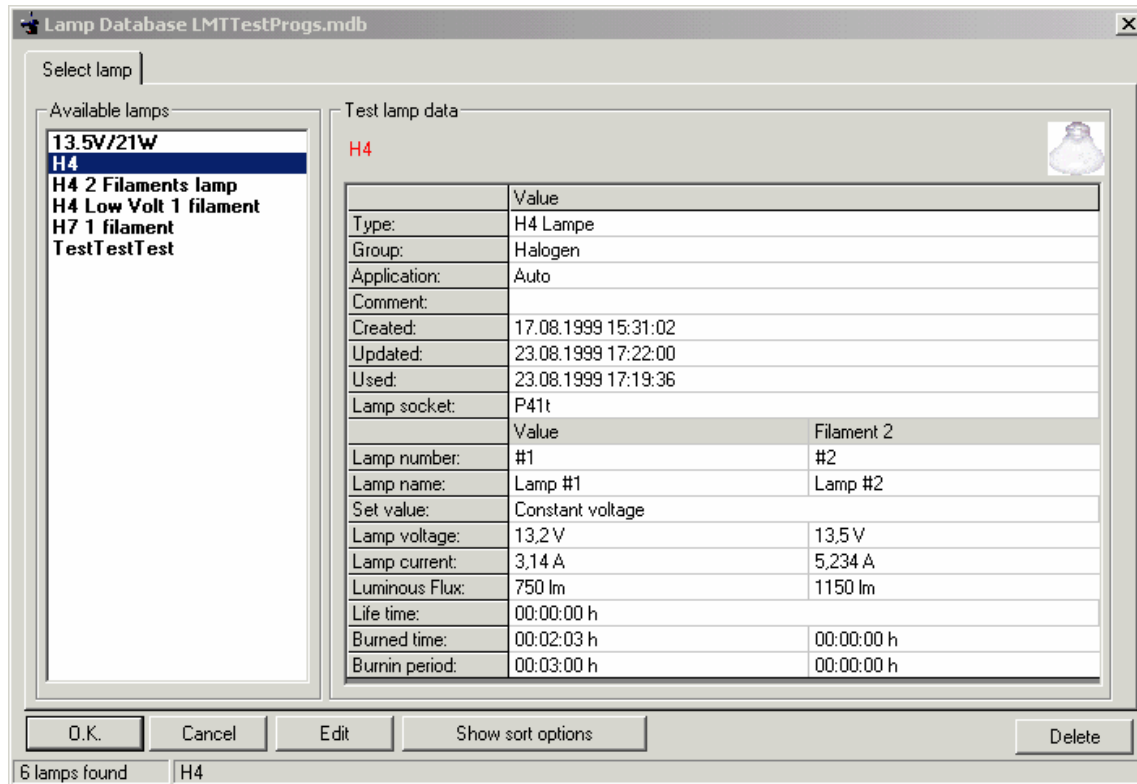
Available lamps:

This is a list of the available lamps in the database. The lamp names are used in this list per default, but this can also be changed by using the sort options of this window. The list is ascendently alphabetically ordered per default.

To **pre-select** a lamp from the database, click on the name in the list. The lamp data is read from the database, and its major content is displayed in the window with the heading "Test lamp data".

To **select** a lamp, either double click on the name in then list, or pre-select it and click on the O.K. button.

To **cancel** selection click on the Cancel button. The pre-selected lamp data is not taken from the database.

To **delete** a lamp, either press the Del key or click on the delete button. Before the lamp is deleted, you have to confirm this action to avoid accidental deletions. Canceling the lamp database by clicking on the cancel button does not recover deleted lamps.

To **see** full details of the selected lamp, click on the Edit button. The Edit lamp window appears.

Show sort options:

Per default all available lamps are shown in the list. This can be changed by clicking on the Show sort options button.
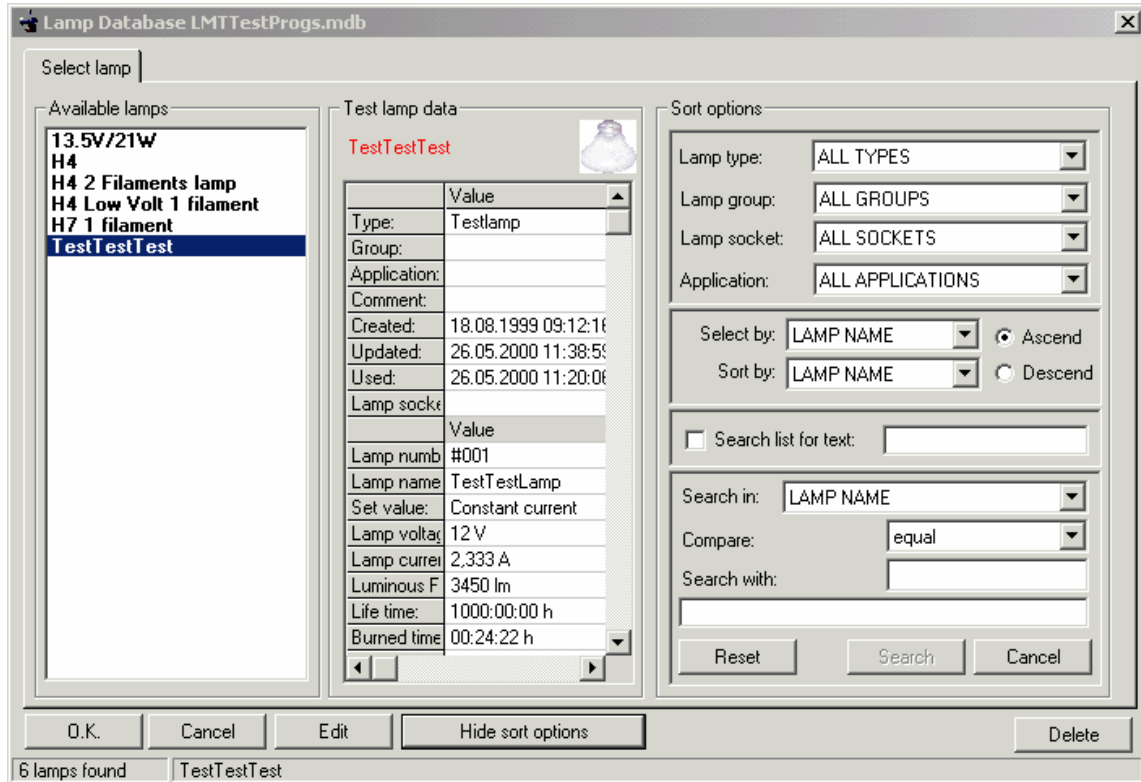
From the available lamps certain lamps can be selected, which fulfill certain requirements. The list of lamps can be reduced to those lamps, which belong to a certain type, group, have a certain socket, or are used for a certain application.

The lamps on the available lamp list can be displayed or sorted by various characteristics.

Special searches for lamps with certain characteristics can be made in the database.

Clicking the **Reset** button resets all pre-selections and sort options, the lamp list shows again all available lamps in the default order.

To suppress the display of the sort order options, click on the Hide sort options button.

Edit lamp

In this window the data of a test lamp can be edited. New lamps can be created and saved into the actual lamp database.

The example above shows the test lamp data editor with a two filament H4 lamp as an example.

General:

Name: The name is used for default selection of the lamp from the database. Long names up to 256 characters can be used. There is no relation to MS-DOS file names. Leading blanks should be avoided.

Type: A new type description can be entered or selected from available types, such as H4 lamp, Incandescent lamp, Fluorescent lamp, HID lamp

Group: An new group can be entered or selected from available groups, such as Halogen, Incandescent. Small, Large, High wattage, etc.

Application: An new application can be entered or selected from available applications, such as Automotive, General, Emergency, Interior, Exterior, etc.

Socket: An new socket type can be entered or selected from available socket types, such as P41t, E27, E14, G5, Ba15s, etc.

New types, groups, applications and sockets are added to the list of available items in the database and can be selected, when another new lamp is edited or an existing one is changed.

Save as a new lamp: If checked an the lamp did already exist in the database, the lamp data would be saved as a new lamp in the default database, when the Save button is clicked.

Created: Date and time of creation of a new lamp in the database.

Last update: Date and time of last modifications of an existing lamp in the database.

Last used: Date and time of last usage of an existing lamp in the database.

The last 3 items are controlled by the software automatically and cannot be changed from the user.

Lamp data:

Number and Name are characteristics to distinguish different lamps.

Voltage and Current can be entered. If a lamp is used in a measurement, and the hardware for measurement of electrical data exists, these values are replaced with the ones most recently measured.

Flux: The actual luminous flux of a lamp.

Nom. Flux: The nominal luminous flux of a lamp as stated in the manufactures catalogue or as required from a test program.

Correct: If Correct photometrical values for nominal luminous flux is checked, and an actual luminous flux is entered different from Zero and different from the nominal flux, and a nominal luminous flux is entered different from Zero, then during a measurement the actual measured photometrical values are recalculated by multiplying them with the quotient of nominal flux and actual flux. This leads to a result as if the lamp would have been operated with a luminous flux as the nominal flux.

Set voltage and **Set current**: The values used for the setting with a computer controlled power supply.

> *Note:*
> *A power supply can only be used in either voltage setting or current setting. If voltage setting is used (voltage control), the current will settle itself according to the lamp properties. If current setting is used (current control), the voltage will settle itself according to the lamp properties. The other value (current for voltage control, voltage for current control) is used as a limiting value for the power supply. The instrument is set in a way, that these value never exceed 1.25 times the entered value.*
>
> *Example: For the first filament 13.2 V and set voltage are used. The instrument will be set to 13.2 V, but the current will never exceed 1.25 times 5 A or 6.25 A, even if a short circuit appears.*
>
> *If a set value of 0 would have been entered instead, the limiting value would be Zero as well, and no current would flow; no voltage would be set, and the lamp would not burn*

Life: The estimated life time of a lamp

Burned: The actual accumulated burn times of the lamp

Stabil. time: The time needed for proper stabilization of the lamp before using in a test after applying the proper electrical values.

> *Note:*
> *The values for burned periods are automatically updated after the test by the LMT LIMES 2000 software, from the time where a lamp is switched on, until it is switched off by means of the LIMES software. If the lamps are operated manually or manually switched off during test, these times are not counted correctly.*

Filament 2

This window appears only if a double filament lamp is used. Here all values can be entered like for the first filament in the frame Lamp data.

Save:

The lamp data is saved into the default lamp database. If Save as new lamp is checked, and a new name is entered in the Name field, the LIMES software creates a new dataset for the lamp. If the lamp exists already in the database, and the name is changed, without checking this Save as new lamp the existing lamp data will be overwritten by the Limes software.

Iso-system databases

Iso-values

This database can be accessed directly from the main menu item Databases.

The iso-values database contains sets of values which are used to display isolux or isocandela diagrams with lines of uniform illuminance or intensity, or to display those values as a coloured diagram (gray scale, color raster, etc.).

Where in the first case each point on a line represents the coordinate in a diagram with identical values, the color raster diagram displays each level of illuminance or intensity with a certain color.
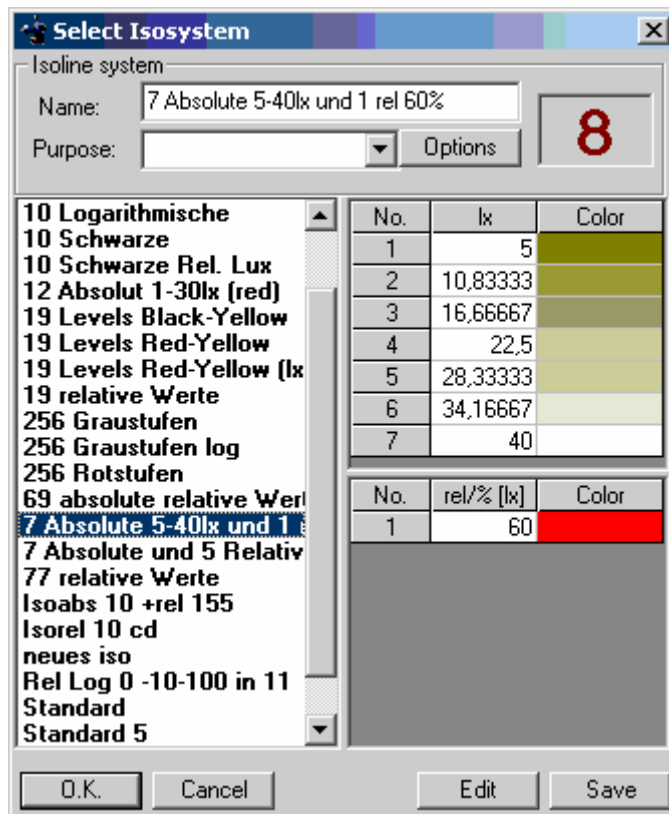
Name: Unique name for a set of iso-values (iso-system). This is a name in a database and does not have the requirements for a file name.

Purpose: A short description for its purpose, to allow easy selection for these iso-values with the Options button

Options: To allow easier selections of iso-values with a certain purpose

Iso-values list: Iso-values in the database. Sorted alphabetically or according to the selections after clicking the button Options

Iso-values: Iso-values are listed in the windows at the right side as absolute or relative values.

Absolute iso-values: Iso-values given in lx or cd. Each value is given with a figure representing a lux or a candela value

Relative iso-values: Iso-values given as a percentage. The values will be related later in the application to a certain (e.g. maximum) illuminance or luminance value. The values must be in the range between 0 and 100

Edit: Allow to edit the pre-selected iso-system

Save: Saving the actual iso-system with the given name into the database. If and iso-system with the same name exists, you are asked to overwrite. To avoid this change the name to an unused name.

To **pre-select** an iso-system from the database click on an entry in the stand list. The data of this iso-system will be displayed

To **select** an iso-system from the database click on an entry in the iso-system list and click on O.K.

To **delete** an iso-system from the database click on an entry in the iso-system list and press the DEL key.

To **cancel** a pre-selection click on the Cancel button.

Edit iso-values

An iso-system is the collection of all values describing a set of isolux or isocandela values. It consists or the values in absolute or relative figures as well as the corresponding line colors.

The iso-system editor is invoked by clicking the Edit-button of the iso-system database window..

Name: Unique name for a set of iso-values (iso-system). This is a name in a database and does not have the requirements for a file name.

Purpose: A short description for its purpose, to allow easy selection for these iso-values with the Options button

8: The number displayed or the right side gives the total number of individual iso-values (absolute plus relative) of the iso-system

Absolute iso-values: Iso-values given in lx or cd. Each value is given with a figure representing a lux or a candela value

Relative iso-values: Iso-values given as a percentage. The values will be related later in the application to a certain (e.g. maximum) illuminance or luminance value. The values must be in the range between 0 and 100

Minimum/Maximum: Absolute or relative values can be entered as a list starting with a minimum, ending with the maximum, where each values are incremented by a value defined the step

Step: This is either a step value or a step number

Step by value: The figure entered in the step field is treated as a value. In the displayed example the list of absolute values would be given by incrementing the value of 5 lx by 7 lx until 40 lx. The list would be 5 – 12 – 19 – 26 – 33 – 40 (lx)

Step by number: The figure entered in the step field is treated as a number. In the displayed example the list of absolute values would be given by incrementing the value of 5 lx in 7 steps until 40 lx. The list would be 5 – 10.8 – 16.7 – 22.5 – 28.3 – 34.2 - 40 (lx)

Linear/log: If steps are selected by number, the increment could be calculated as linear (equal increments) or logarithmic (increasing increments acc. to the logarithm of the value)

Unit: Select the unit of the absolute or relative values, either lx or cd

Set an individual value: Click on a value field in the value list and enter a new value directly there.

Default: Clicking on the default button sets the LIMES default values.

Color assignment

The rectangular color fields behind the values for minimum and maximum are used to select the color of the iso-line given by the certain iso-value. For display of coloured diagrams a range of color can be selected, which changes smoothly from a color for the minimum to a color for the maximum value.

To select a certain color click on one of the rectangular color fields behind the values for minimum and maximum. Select any of the offered colors and close the selection. The selected color will be shown in the rectangular field.

After selecting both colors for minimum and maximum you can set a color range by clicking on the Set button.

To assign an individual color of the list of values click on the rectangular color field behind the value in the list field, than select a color as described above.

Saving into the database

To save the selected and entered values, click on the O.K.-button. The isolux database reappears and you can click on the Save button to save the iso-system.

Test stand databases

Test stands

This database can be accessed directly from the main menu item Databases.

Test sample holders are defined in a database as "Test stands". Each stand is characterized by location (where to find it) and with several values regarding its functions.

The test stand data is used for indicating the position within the goniometer, or the dislocation of the photometrical center or the test sample from the photometrical center of the goniophotometer

Automotive lighting:

For goniophotometers equipped with CCT Computer Controlled Table the test stand data can also be used to automatically center the test sample in the goniophotometer.

Name: A unique name for a test sample holder

Purpose: A short description for its purpose, to allow easy selection for these stands with the Options button

Options: To allow easier selections of stands with a certain purpose

Stand list: Test sample holders in the database

Location: A description where to find the stand in the warehouse of the lab

H-Offset, V-Offset: Offset angles automatically to be set when the selected stand is used

X/Y/Z-position: Dislocation of the photometrical center of the test sample from the photometrical center of the goniophotometer

Edit: Modify a test stand or create a new one in the database

To **pre-select** a stand from the database click on an entry in the stand list. The data of this stand will be displayed

To **select** a stand from the database click on an entry in the stand list and click on O.K.

To **delete** a stand from the database click on an entry in the stand list and press the DEL key.

To **cancel** a pre-selection click on the Cancel button.

Edit test stand

The test stand editor is used to modify the characteristics of a test sample holder or create a new one. It can be accessed through the main menu item "Databases", then click on the edit button.

Name: A unique name for a test sample holder

Purpose: A short description for its purpose, to allow easy selection for these stands with the Options button

Options: To allow easier selections of stands with a certain purpose

Stand list: Test sample holders in the database

Location: A description where to find the stand in the warehouse of the lab

H-Offset, V-Offset: Offset angles automatically to be set when the selected stand is used

X/Y/Z-position: Dislocation of the photometrical center of the test sample from the photometrical center of the goniophotometer

Save: Save the test stand data into the default stand database

Automobile databases

Automobiles

This database can be accessed directly from the main menu item Databases.

The automobile database contains sets of values which are used to create an automobile for road lighting simulation with automobile lamps illuminating a road.
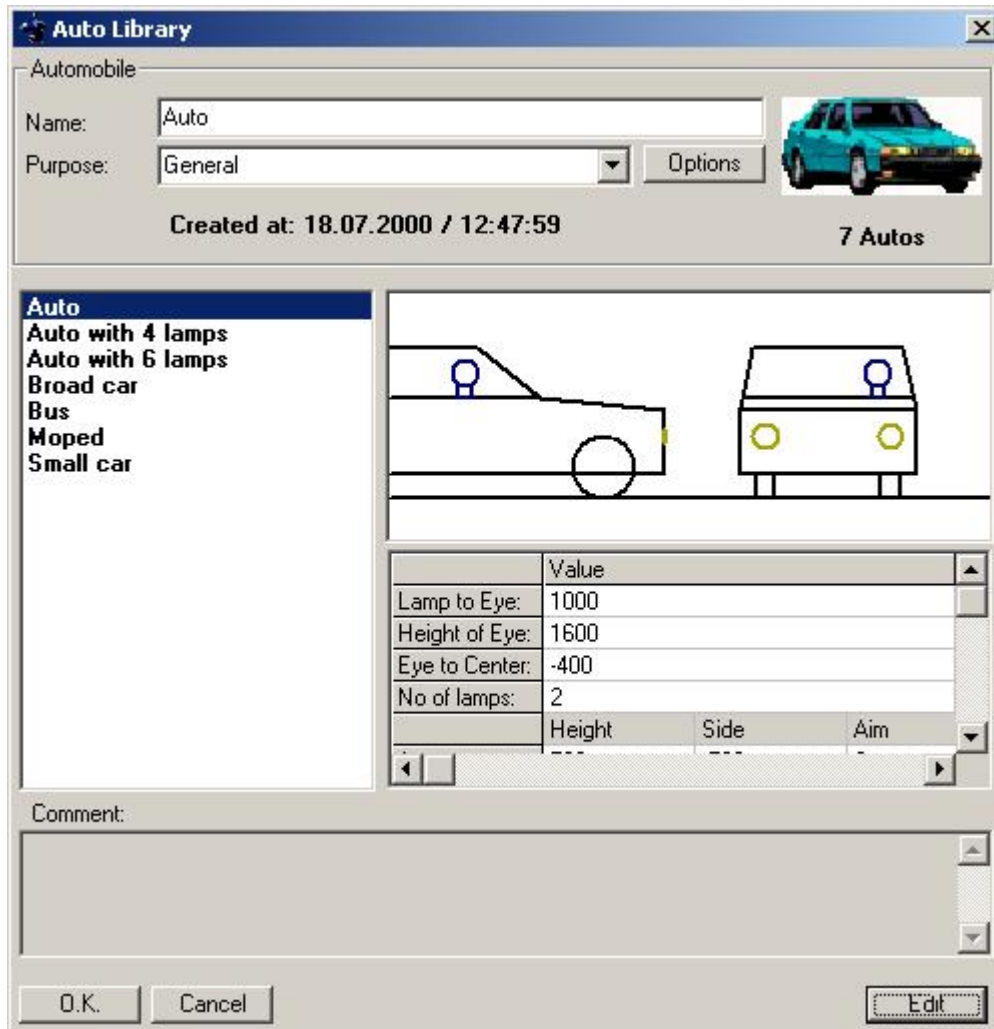
Name: The name of the automobile under which it is selected from the database

Purpose: A short description for its purpose, to allow easy selection for the automobile with the Options button

7 Autos: No. of automobiles in the database

Options: To limit the display of automobiles for those which match the selected purpose

Show only purpose: Only automobiles, which match the displayed purpose, are shown in the list

Sort by: Allows to select the order of automobiles in the list either by name, purpose, date of creation, or no. of lamps. The active option gets a mark in front of it.

Only n lamps: Displays only automobiles in the list, which have the selected no. of lamps

Automobile list: Click on a name to pre-select an automobile and to display its properties. Double click to select and terminate.

Graphic: Displays the pre-selected automobile with its properties as graphics

Value table: The pre-selected automobile with its properties as values

Comment: Any entered comment for the automobile.

O.K.: Accept and terminate

Cancel: Throw away the pre-selection

Edit: Modify the pre-selected automobile or create a new one, opens the Edit automobile window

Edit automobile

The automobile editor allows the creation or modification of an automobile. This window can be opened by clicking on the Edit button in the Automobile database window

An automobile is defined by a set of values which are required for calculation of road lighting by automobile headlamps or other lamps. The values are defined in this window as described below.

> *Note:*
> *Any changes made in one of the value fields will automatically re-draw the automobile in the picture to visualize the configuration.*

Name: The name of the automobile under which it is selected from the database

Purpose: A short description for its purpose, to allow easy selection for the automobile with the Options button

Dimensions: Dimensions can be entered either in mm or inch as selected

Driver: Information of the position of the drivers eyes in the automobile in relation to the headlamps position

Height of drivers eye: The height above ground. Must be a value greater than Zero

Distance between lamp and eye point: The distance measured parallel to the road

Distance between eye point and car center: The distance measured perpendicular to the road. A driver in a car for right hand traffic usually sits on the left side of the car, the distance to the center to left is given

with negative numbers. A driver of a bicycle, moped, or motorbike sits in the center, the value would be Zero

Comments: Any comments to describe the automobile and its purpose as information

Lighting system: The headlamps of this automobile are simulated with test sample data files containing light distributions later in the light simulation calculation. Only those headlamps can be installed (files can be assigned), if the headlamp positions are specified here. Each position later can contain one single distribution

Height: Click on the field in the table to enter the value

Distance: Click on the field in the table to enter the value. Headlamps on the left side of the car as seen from the driver are given with negative values

Aiming: Click on the field in the table to enter the value. The Aiming value is given in mm for a distance at 10 m, a positive value aims the headlamp downward. (A value of 100 mm aims the headlamp 0.57 deg down)

> *Note:*
> *As the light distribution data later is used as measured, any aiming value in this field will be additionally to any real aiming of the headlamp when it was measured.*

Add lamp: Adds a lamp position to the car

Delete lamp: Deletes a lamp position from the car

Up/down buttons: Even if the order of lamps as they appear in the list is not important for the calculation later in the light simulation, the order of appearance can be changed. By clicking on one of these buttons the selected lamp moves a position up or down

O.K.: Accepts the values and terminates this window

Cancel: Throws away all modifications

Save: Saves the automobile into the actual database

Road databases

Roads

This database can be accessed directly from the main menu item Databases.

The road database contains sets of values which are used to create a road for road lighting simulation with automobile lamps illuminating a road.

Name: The name of the road under which it is selected from the database

Purpose: A short description for its purpose, to allow easy selection for the road with the Options button

6 Roads: No. of roads in the database

Options: To limit the display of roads for those which match the selected purpose

Show only purpose: Only roads, which match the displayed purpose, are shown in the list

Sort by: Allows to select the order of roads in the list either by name, purpose, date of creation, or road length. The active option gets a mark in front of it.

Only n lanes: Displays only roads in the list, which have the selected no. of lanes

Road list: Click on a name to pre-select an road and to display its properties. Double click to select and terminate.

Graphic: Displays the pre-selected road with its properties as graphics

Properties: The pre-selected road with its properties as values. See edit road for explanation

Comment: Any entered comment for the road

O.K.: Accept and terminate

Cancel: Throw away the pre-selection

Edit: Modify the pre-selected road or create a new one, opens the edit road window

Edit road

The road editor allows the creation or modification of a road. This window can be opened by clicking on the Edit button in the road database window.

A road is defined by a set of values which are required for calculation of road lighting by automobile headlamps or other lamps. The values are defined in this window as described below.

> *Note:*
> *Any changes made in one of the value fields will automatically re-draw the road in the picture to visualize the configuration.*

Name: The name of the road under which it is selected from the database

Purpose: A short description for its purpose, to allow easy selection for the road with the Options button

Dimensions: Dimensions can be entered either in m or feet as selected

Road dimensions: The dimensions of the road given in the selected unit

Length: The total length as shown in the graphic

Left width: The dimension of the road area measured from the position of the automobile on the road to the left in driving direction

Right width: The dimension of the road area measured from the position of the automobile on the road to the right in driving direction

Width of lane: The width of one of the lanes. All lanes have equal widths

No. of lanes: Any value allowed, should be larger than Zero

Automobile position properties: The automobile is placed at the beginning of the road, so that the headlamps appear at the road length position Zero (the left border of the road diagram). As the driving direction is always assumed to be from left (Zero) to right (maximum road length), the driver's eye position is away from the beginning of the road, if the Distance between lamp and eye point of the car is given with a positive value.

Right hand traffic: The automobile is in the center of the right most lane (if no offset specified)

Left hand traffic: The automobile is in the center of the left most lane (if no offset specified)

Automobile offset: As default the automobile is in the center of the lane. Any offset value moves the automobile out of this center. A negative value moves to the left, a positive value to the right as seen from the driver

Calc. step length: The step width of the road lighting simulation calculations in road length direction

Calc. step width: The step width of the road lighting simulation calculations in road width direction

> *Note:*
> *The selection of step widths influences the accuracy of the result of road lighting calculations as well as the required calculation time. As road illuminances are only calculated at the points on the road at the given steps, all values in between have to be calculated by interpolation. The density of calculation points should therefore be selected according to the expected uniformity of road illuminances and the uniformity of the light distribution of the automotive lamp*

Road marking frame: Click on the colored rectangle to allow the selection of a color for drawing the frame around the road marks (those lines which separate the lanes)

Road marking fill color: Click on the colored rectangle to allow the selection of a color for drawing the road marks area

Reflectance: Select a property for the characteristic of road reflectance. This will influence the road luminance calculation

OK: Accepts and terminates

Cancel: Throws away all modifications

Save: Saves the road into the actual road database

Glare diagram databases

Glare diagrams

This database can be accessed directly from the main menu item Databases.

The glare diagram database contains sets of values which are used to create a glare diagram for glare evaluation on general lighting luminaire data.

Glare diagrams are of the type 'SÖLLNER' diagrams which estimate the glare by comparing mean luminances of luminaries in certain directions with so-called border-luminances. Border luminances depend on quality parameters and illuminance levels. These values can be modified by editing glare diagrams.

The glare diagram database shows all available diagrams.
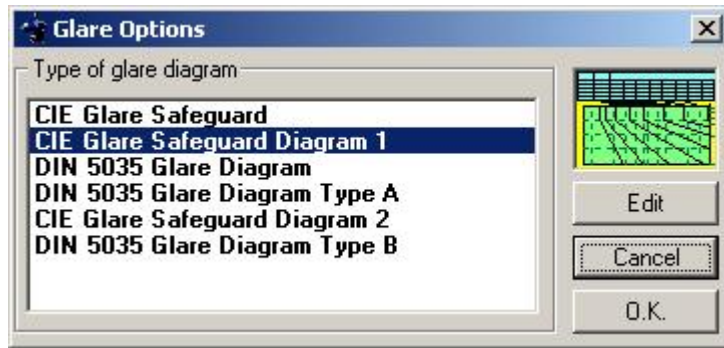
Type of glare diagram: To pre-select click on a name in the list, to select double click on it.

Edit: Displays the glare diagram edit window

Cancel: Throws away the pre-selection and terminates

O.K.: Accepts and terminates

Edit glare diagrams

This window is shown by clicking on the Edit button in the glare diagram database window. It allows the setting of the individual characteristics of a glare diagram as well as its layout.
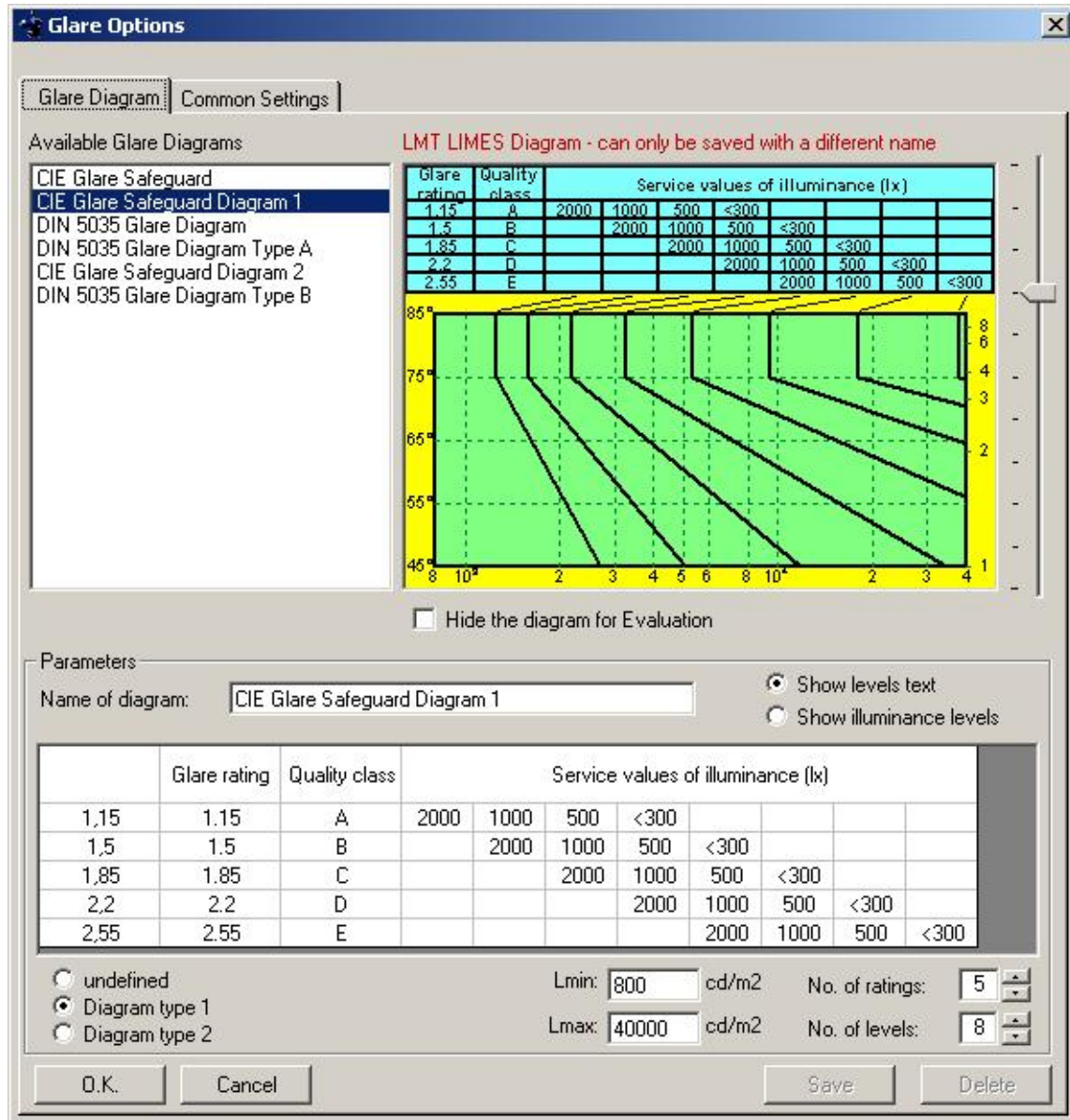
Glare diagrams: The list of available glare diagram names in the database. To select a diagram click on one of the names in the list The glare diagram will be drawn in the graphic field and its properties will appear in the value fields.

LMT LIMES Diagram: There are special diagrams in the database created by LMT. These appear with the message as shown and cannot be re-saved into the database with the same name

Hide diagram for evaluation: A hidden diagram does not appear in the evaluation menus of the Limes main window

Name of diagram: The name used to save the diagram into the database, and to be displayed in evaluation reports

Show levels text: Displays the text as usually shown for the illuminance levels in the value field

Show illuminance levels: Displays the illuminance levels in the value field which are used for glare evaluation

Value field: Constructed according to a standard SOELLNER diagram

Diagram type 1/2: Diagram type as defined by CIE for orientation of luminaries etc.

Undefined: No diagram type specified

> *Note:*
> *Diagrams with an assigned diagram type can only display luminance distributions in C-planes according to the type as defined by CIE*

Lmin: Minimum luminance in the diagram (left end of the horizontal scale)

Lmax: Maximum luminance in the diagram (right end of the horizontal scale)

No. of ratings: The number of glare ratings in the diagram (the number of horizontal rows in the value list below the heading)

No. of levels: The number of illuminance levels in the diagram (the number of vertical columns in the value list beneath the heading)

■ Common settings

Common settings

This window is the second page of the Edit glare diagrams window. The common settings influence the order of appearance in the evaluation menu and the report list.
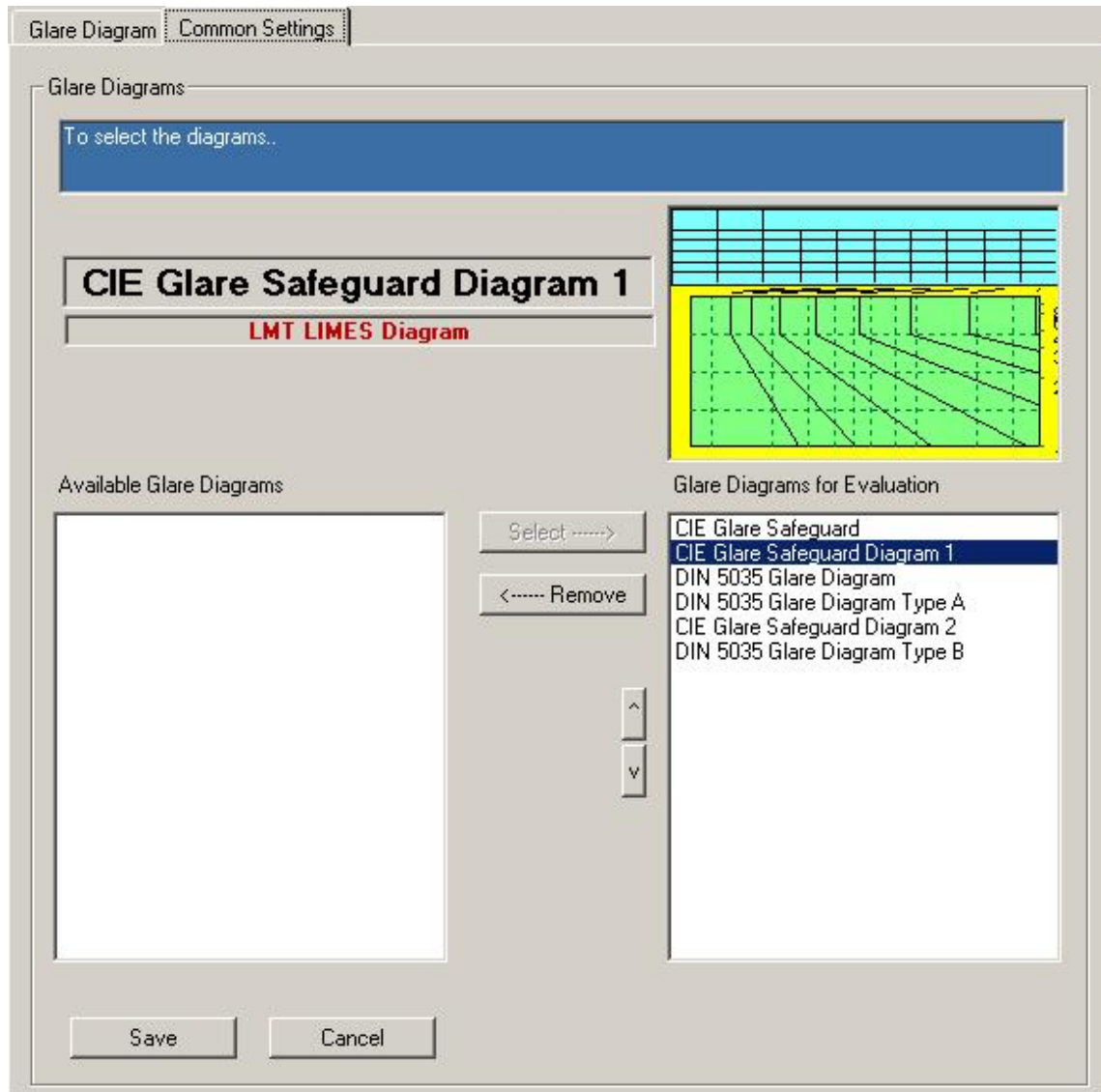
CIE Safeguard…: The glare diagram name

LMT LIMES Diagram: Indicates a diagram created by LMT

Available glare diagrams: Show all glare diagrams which have not been selected to appear in the evaluation menu. Click on the **select** button to move a selected diagram into the right evaluation list

Glare diagrams for evaluation: Show all glare diagrams which have been selected to appear in the evaluation menu. Click on the **remove** button to move a selected diagram into the left available diagram list

Save: Saves the modifications into the database

Cancel: Throws away any modification

Aiming databases

Aiming

This database can be accessed directly from the main menu item Databases.

The aiming database contains sets of values which are used to create a procedure for analyzing the cutoff of a European dipped (low) beam headlamp.

▣ Measurement of cutoff
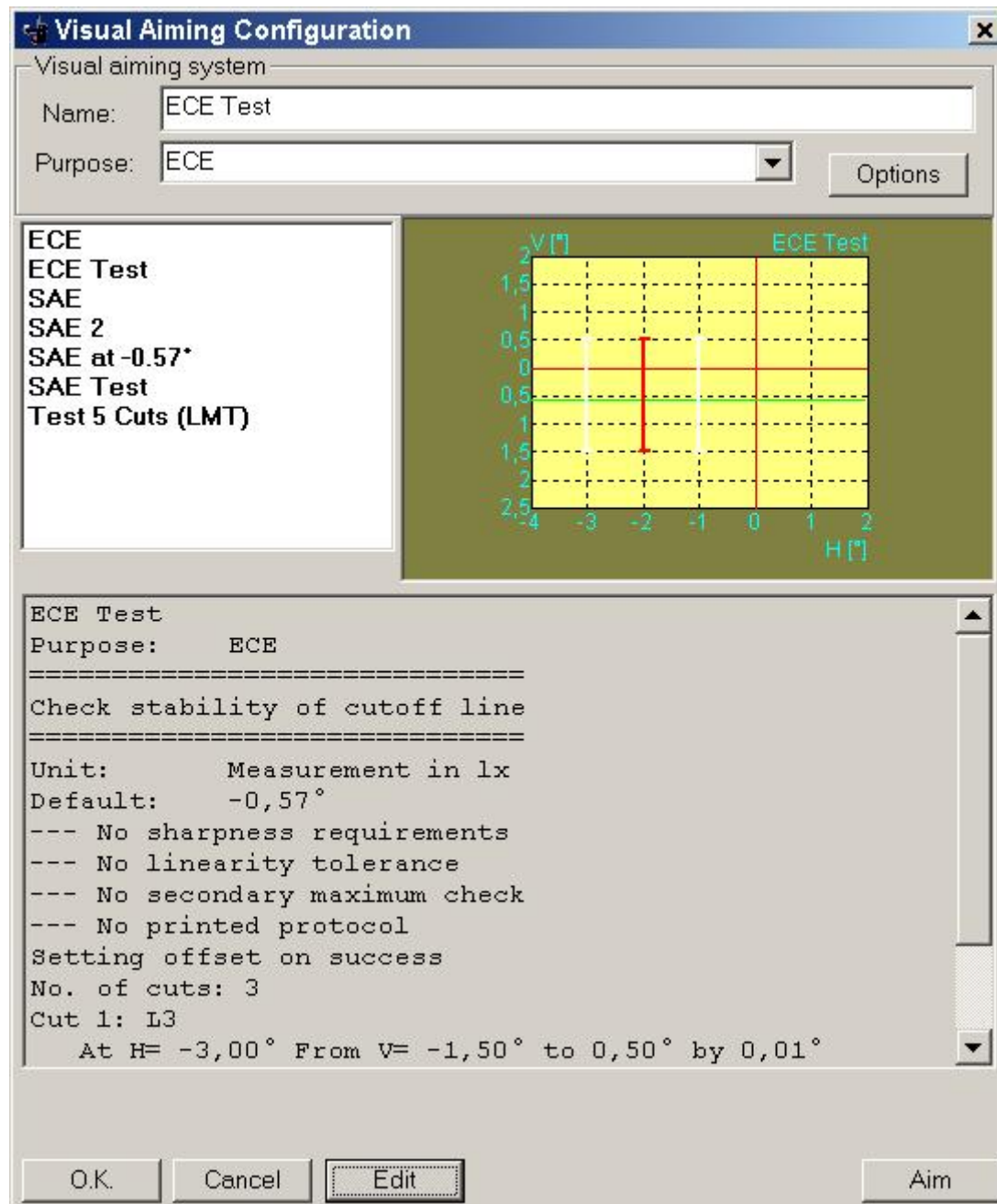
Name: The name under which the configuration is found in the aiming database
Purpose: A short description for its purpose, to allow easy selection for the road with the Options button

Aiming list: The list of available configurations in the database. Click on a name in the list to pre-select a configuration, double click to select

Graphics: Shows the location of the vertical cuts in the pre-selected configuration. The horizontal scale shows the horizontal angular range of all cuts, the vertical scale the vertical range

Value field: The summary of the pre-selected configuration is displayed

> *Note:*
> *The selected aiming system is used for stability check*

OK: Accepts the pre-selection and terminates

Cancel: Throws away the pre-selection and terminates

Edit: To modify the pre-selected aiming setting or create a new one click on the edit button

Save: Saves a modified configuration into the databas

Aim: Performs the aiming procedure

> *Note:*
> *The aiming procedure performs actual measurement with the goniophotometer. The system must be ready, e.g.:*

- *The Limes program must be connected to LimesControl*
- *The goniophotometer must be ready for computer control (the Auto-Stop-Manual switch on the goniometer control-unit must be set to Auto)*
- *The headlamp must be set and aligned on the goniometer, the lamp burning*

Edit aiming

This window can be accessed by clicking on the edit button on the aiming database window.

Name: The name under which the configuration is found in the aiming database

Purpose: A short description for its purpose, to allow easy selection for the road with the Options button. Enter a new purpose or select an existing one

Graphics: Shows the location of the vertical cuts in the pre-selected configuration. The horizontal scale shows the horizontal angular range of all cuts, the vertical scale the vertical range

Cuts: The existing cuts (vertical scans) of this configuration

Vertical scan: The name of the actual cut

Vertical scans: The list of cuts in this configuration. To pre-select a cut click on the name in the list. To select, double click on the name, and the values associated with this cut are displayed in the data fields (At H, From V, To, Step,Default)

At H: The horizontal position of the cut in deg

From V: The vertical start position of the cut

To: The vertical end position. Must be larger than the start value

Step: The angular step width of the cut (recommended 0.1 deg)

Default: If checked, this cut is regarded as the default cut, from which the sharpness, secondary maximum, and offset position is derived

> *Note:*
> *The cutoff line of the headlamp to be tested must fall into the range of the cut, otherwise it cannot be detected. This is done either by alignment of the headlamp, or increasing the range until the cutoff can be expected to be within the range. The disadvantage is only a slightly longer measurement time.*

Add: Adds the new cut with the name given in the vertical cut field and the properties in the data fields to the list of cuts

Replaces: Replaces the pre-selected cut in the list of cuts with the new cut with the name given in the vertical cut field and the properties in the data fields

Insert: Inserts the new cut with the name given in the vertical cut field and the properties in the data fields before the pre-selected cut in the list of cuts

Delete: Deletes the pre-selected cut from the list of cuts

Settings: The parameters for cutoff line evaluation

Default position: The default vertical position of the headlamps cutoff given by legal requirement. For ECE headlamps a value of –0.57 deg corresponds with the default aiming of 100 mm in 10 m distance below the horizontal. SAE usually requires a default position of –0.4 deg.

Min. sharpness: The minimum sharpness required for this headlamp

Max. sharpness: The maximum sharpness required for this headlamp

Secondary maximum: The maximum value for a secondary maximum as a factor to the maximum gradient in the cut

Linearity tolerance: The allowed deviation of the cutoff position or each other cut from the position of the default cut

Options: These options describe the content of the cutoff setting

Check sharpness: If checked the sharpness is calculated and compared with values given for minimum and maximum

Check linearity: If checked the linearity of the cutoff is checked by comparing the deviations of the cutoff position at the individual cuts with the position of the default cut, and checking against the allowed tolerance

Check secondary maximum: If checked a secondary maximum is detected, and if it exists, its value is compared against the allowed maximum value

Print protocol: A protocol is printed automatically and the aiming procedure is terminated automatically as well

Set vertical offset: The headlamp is aimed by setting a goiniometer offset to the difference between the detected cutoff position of the default scan and the given default position acc. to the requirements

Check stability of cutoff-line: Enables the Stability button and allows the time settings for stability of cutoff-line check

Units: Select lx (typical for ECE) or cd (typical for SAE) as unit during measurement of the cutoff.

OK: Accepts all modifications and terminates

Cancel: Throws away all modifications and terminates

Default: Takes the default configuration as defined in the Limes program and displays the values in the value fields

Stability: Invokes the waiting time editor for stability check

Stability of cutoff-line settings
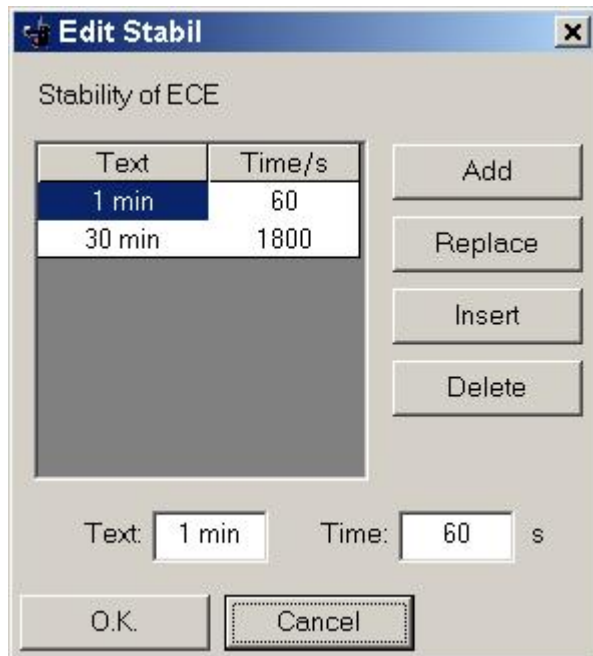
The table shows the list of selected (or entered) times, after which a visual aiming procedure is done.

To add a new time, enter the time in seconds in the time field on the left bottom. You can enter a description of the time in the text field on the left side.

Add. Adds the content of the text and time fields to the list

Replace: Adds the content of the text and time fields to the list by replacing the marked fields

Insert: Adds the content of the text and time fields to the list before the marked field

Delete: Deletes a time from the list

O.K.: Accept and continue

Cancel: Throw away modifications and continue

Aiming procedure

The aiming procedure can be started by clicking on the aim button on the aiming database window. The system must be ready, e.g.:

❑ The Limes program must be connected to LimesControl

❑ The goniophotometer must be ready for computer control (the Auto-Stop-Manual switch on the goniometer control-unit must be set to Auto)

❑ The headlamp must be set and aligned on the goniometer, the lamp burning
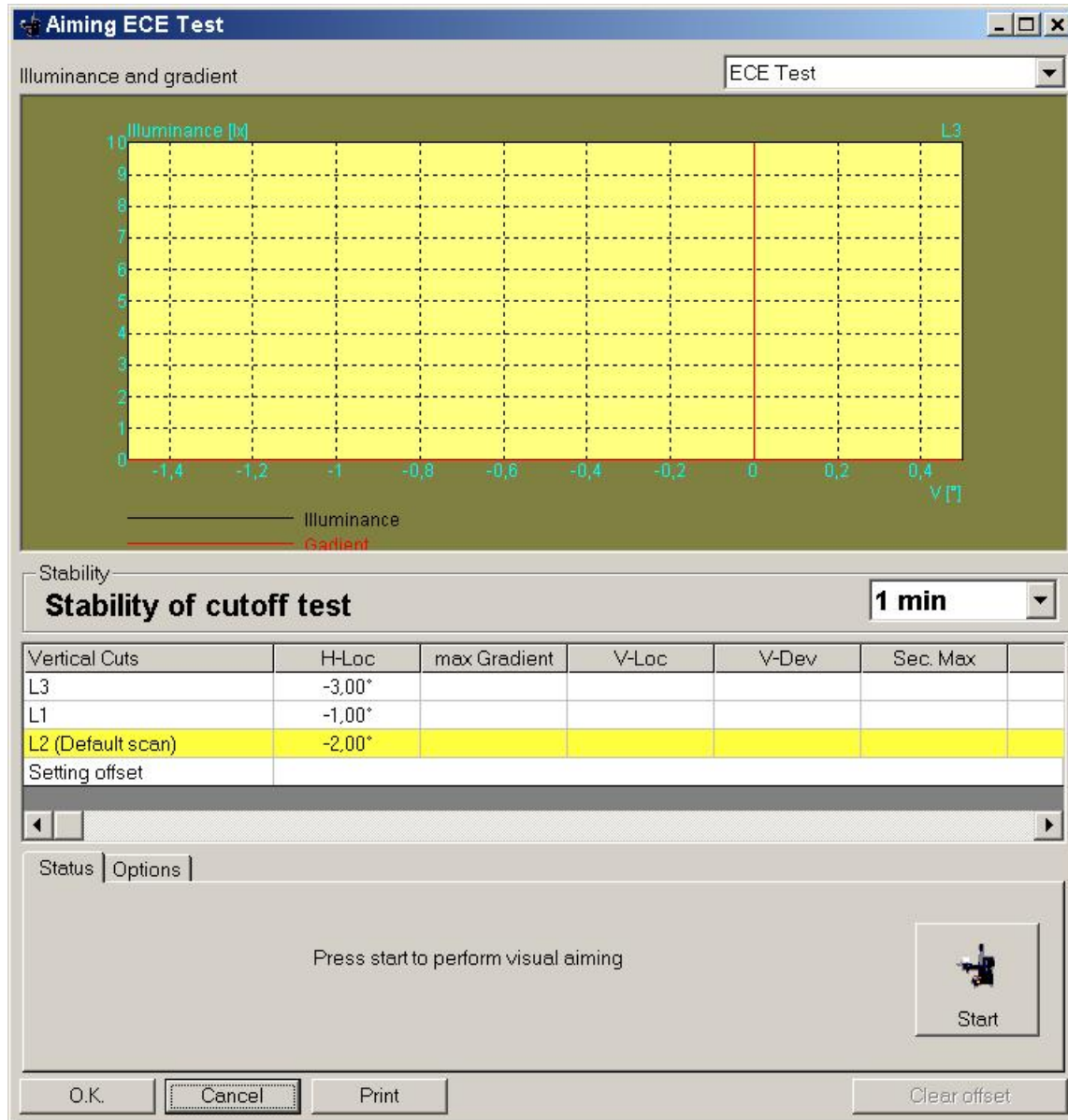
The **graphic** shows an illuminance or intensity and gradient diagram. The vertical scale is automatically ranged according to the measured illuminances or intensities, the horizontal axis shows the range of vertical angles of the selected cut.

The **value field** shows the parameters for all cuts and contains fields, in which the results will be displayed after measurement. The yellow marked cut is the actual (active) cut, which corresponds to the graphics above. To select another cur click on the name field

Status: this area shows the status during measurement

O.K.: Terminates and accepts any measured values

Cancel: Terminates and throws away all measurements

Clear offset: Clears an offset angle, if any, of the goniometer. This button is disabled if not offset exists

Stability of cutoff test

This item appears only if a stability test is performed. The pull down box allos to view the results for the measurement at certain times as well as the summary of the test

Options

Certain options can be set prior to the test.
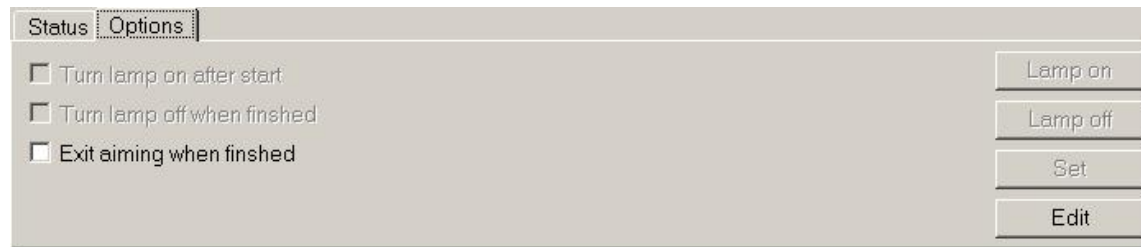
Turn lamp on/off: Let the visual aiming program turn of the lamps before and after test. This is for stabilization test only

Exit when finished: Terminate the visual aiming automatically and do not wait until the user himself closes this window

Lamp on / Lamp off: Turn lamp on or off now

Set: Invoke the power supply control window and allow to set the lamp to a voltage or current

Edit: Edit the lamp data

Measurement of cutoff

Start: Click on this button to allow the measurement to be started

The program performs a vertical scan at the given angles and measures the illuminance or intensity distribution. The gradient is calculated from the values. Both photometrical and gradient curves of the cut are displayed. The color of the curves as displayed in the graphics allows to distinguish the results. The photometric curve is absolute and matches the scale on the left side of the diagram, the gradient curve is displayed relative to its maximum, and therefore always reaches the top of the diagram at least one position, the position which defines the cutoff position.
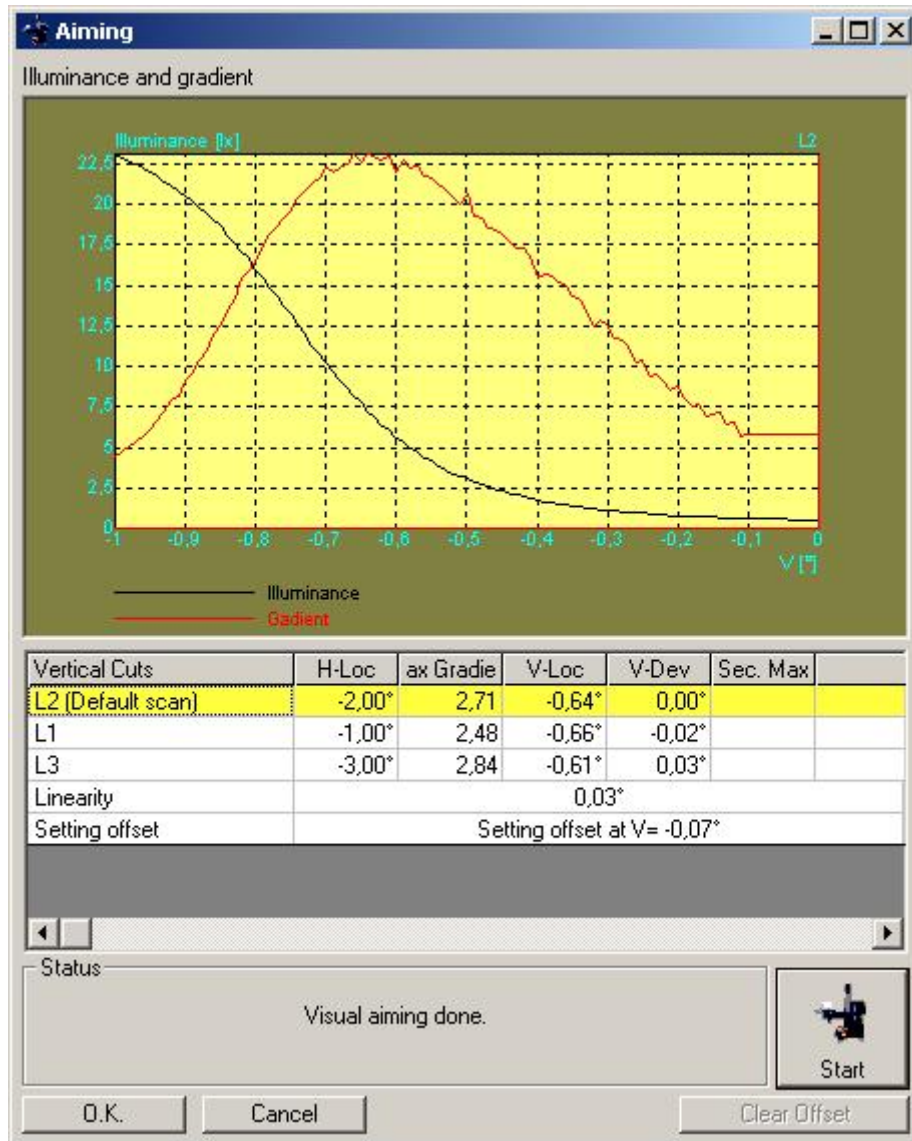
If required sharpness and secondary maximum are calculated and displayed. The field V-Loc shows the absolute position of the maximum gradient in goniometer coordinates. The V-Dev field shows the deviation from the default position of the cutoff.

> *Note:*
> *For the default cut the value for the deviation is always Zero per definition!*

After finishing one cut the next cut is measured, the results are displayed, and so on until all cuts have been measured.

If no protocol is printed automatically, the user can re-call the drawing of the graphic for any cut by clicking on the name in the cut list in the value field.

If an offset is detected, the program asks to confirm the setting.

The measurements can be repeated as often as necessary.

Stability test

If a stability test is performed, the aiming procedure does not start immediately after clilcking on the Start button, but after the entered waiting time is exceeded. The count down time is displayed on the screen.

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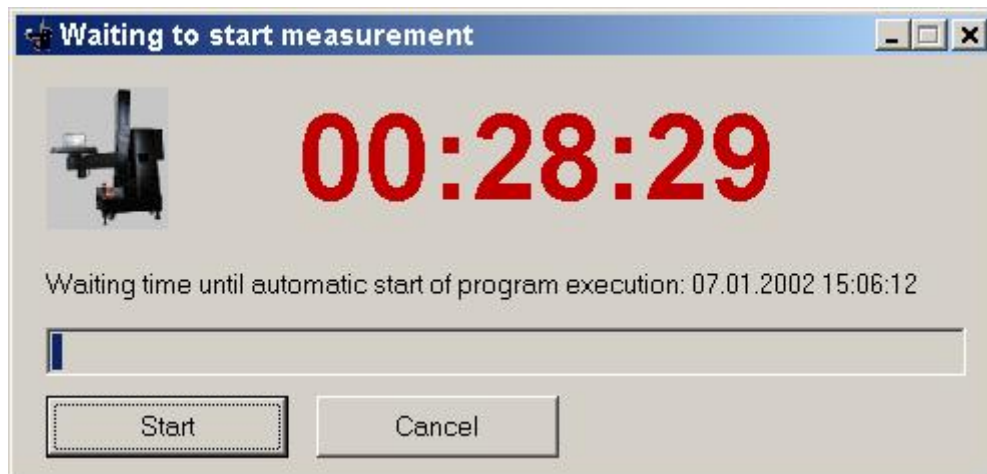
To start now, click on the **Start** button

To terminate the aiming, click on the **Cancel** button

When all individual cutoff measurements have been finished, the deviations are presented in the Stability summary.

Summary	Times/s	max Gradient	V-Loc [°]	V-Dev [mrad]	
1 min	60	0,00	0,00	0	
30 min	1800	0,00	0,00	0,00	

The table shows the times, max. gradients, their vertical locations, and the deviations between the locations in mrad.

Color areas

Color areas

This database can be accessed directly from the main menu item Databases.

The color area database contains sets of values which are used to create areas or regions in the CIE color diagram which are given as requirements for signal colors.

A color area system is defined by one or more areas. Each area is defined itself as a polygon created from straight lines, which are calculated by geometrical functions as defined in ECE or SAE regulations or in the CIE report on colors for signal lamps.

When called from the options button during evaluation of a CIE color diagram or an iso-color diagram, this window allows to the select an color area system from the database. If accessed from the Limes main database menu, this window is skipped and the color areas editor is displayed directly
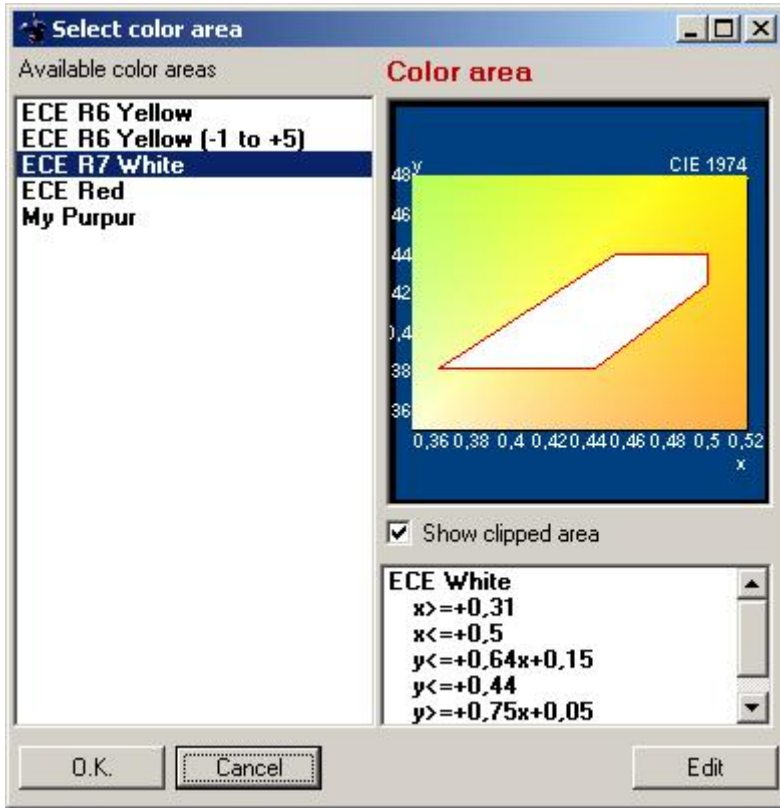
Available color areas: Shows the available color area systems in the database, To pre-select click on to a name in the list. To select double click on it. To delete press the delete key.

The color area is displayed as a clipped region of the CIE chromaticity diagram (color diagram). The list box below the graphics displays the geometrical functions which are used to create the polygon which outlines the color area.

If the **Show clipped area** check box is unchecked, the full CIE color diagram is shown.
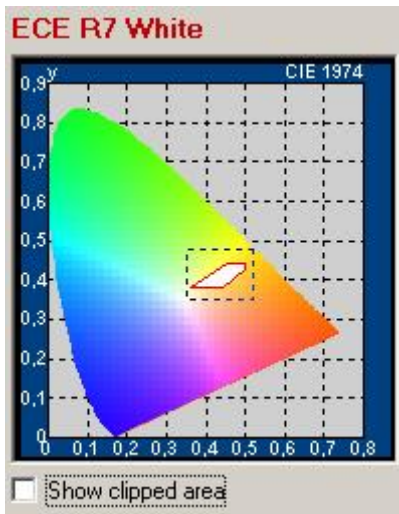
O.K.: Accepts the selection and continues

Cancel: Throws away the selection and continues

Edit : Displays the color areas editor.

Edit color areas

This database can be accessed directly from the main menu item Databases.

If accessed from the Limes main database menu, the color areas editor is displayed directly.
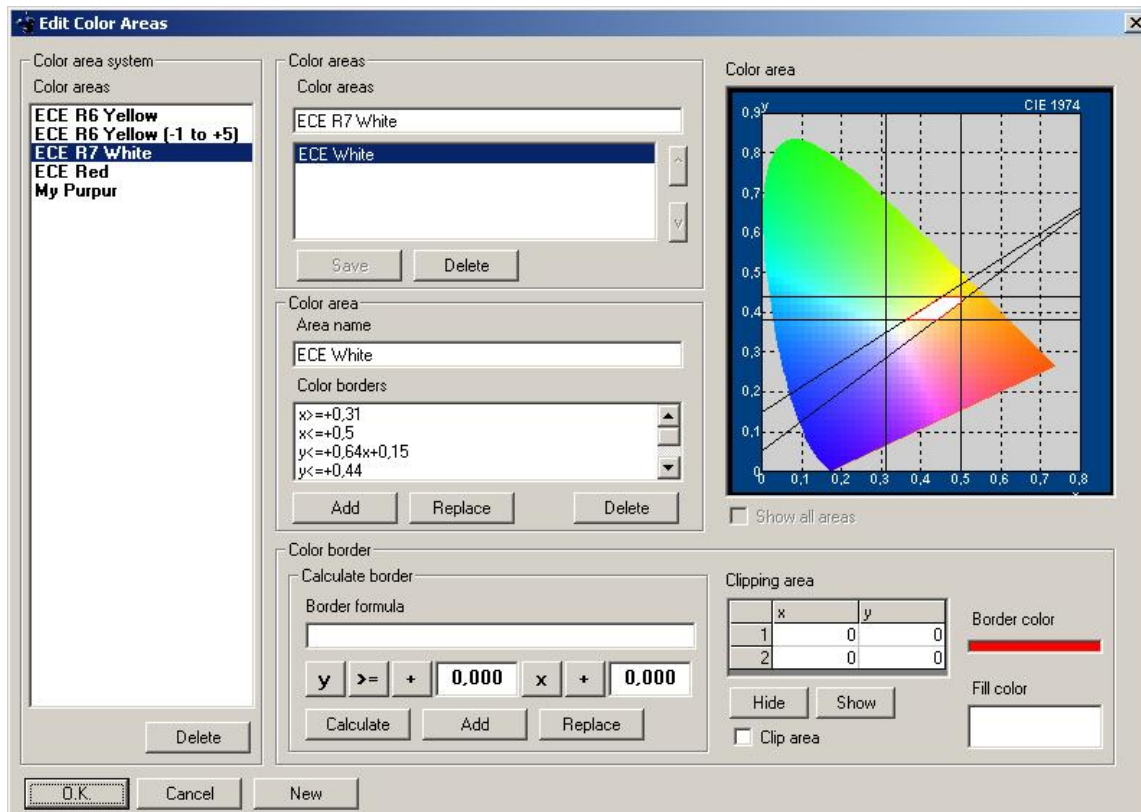
Color area systems: The list box shows the available color area systems in the database, To pre-select click on to a name in the list. To select double click on it. To delete press the delete key.

The color area is displayed within the CIE chromaticity diagram (color diagram)

Color areas: Each color area system can consist of one or more individual color areas. Each are is defined with a name. To select an area for editing, click on the name in the list. To delete click on the delete key.

Color area: Each color area is defined itself as a polygon created from straight lines, which are calculated by geometrical functions as defined in ECE or SAE regulations or in the CIE report on colors for signal lamps.

Add (a color area): Adds a new color area to the list of color areas in the color area system

Replace (a color area): Replaces the pre-selected area in the list of color areas of the color area system by the actual color area

Color area (graphic): Displays the selected color area and shows the full geometrical functions

Show all areas: Displays all color areas in the color area system

Clipping area: Allows the definition of the clipped area when displaying the color area system in a CIE color diagram. You can enter the limiting coordinates of the clipping rectangle

Clip area: if checked the clipped are is shown

Border color: Defines the color in which the outline (border) of a color area is drawn

Fill color: Defines the fill color of the color area

Note:
You can select a color when clicking on the rectangle. You should select a color matching the
color in the region, but you are completely free to do so.

Border calculator

The border formula is created as:

F equal sign f times g add c

Where is:

- ❑ **F** is either x or y or z
- ❑ **Equal** is either >= or <=
- ❑ **Sign** is either plus (+) or minus (-)
- ❑ **f** is a factor (positive value)
- ❑ **times** is the multiply sign (* or x)
- ❑ **g** is either x or y. but cannot be the same like F. If F is z, you cannot enter g
- ❑ **add** is either add (+) or substract (-)

To change the formula click on the formula buttons. When you finished your selection click on the **Add** button to add the formula to the color area or the **Calculate** button to calculate and display the line in the graphics.

Click on **Replace** to replace the pre-selected formula in the list of formulas of the color area

When you are finished with all formulas to create a closed polygon, you can either add the area to the list of areas in the color area system, or replace an existing one.

Hardware

Hardware menu

This item is a menu item of the Limes Main Menu.

The hardware menu can be used to connect or disconnect the Limes program to the LimesControl program and to check the connection status. When the connection is active, several processes with the hardware available at the LimesControl program can be performed.

The hardware menu shows all hardware functions disabled before connection:

Hardware menu without connection to LimesControl

To connect click on the Connect menu or use the button in the toolbar.

Hardware menu with connection to LimesControl

Please refer to the chapter concerning the hardware control as follows:

Connect/Disconnect

This item is a sub-menu item of the Limes Hardware menu. Connecting and disconnecting can also be performed by use of the main toolbar. Connection is established automatically either at program start or at the start of test program execution.

When Connect is selected, the Limes program tries to communicate with the LimesControl program via the selected type of connection modus.

> *Note:*
> *Make sure that the LimesControl program is running and that the settings in the Program options for connection are correct.*

A message shows the opening of connection:

When the connection was successfully opened, the message disappears and the right hand corner of the Limes main window shows a green circle.

During active communication this circle turns red, if the connection is closed, this circle is gray again.

The **Connect** menu changes its caption to **Disconnect**. When it is used again, the connection is closed.
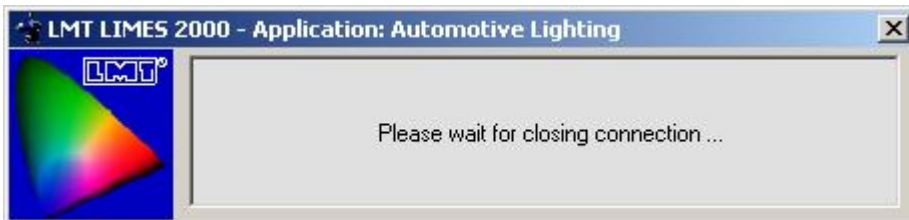
After closing the connection this message disappears again, the menu caption changes back to **Connect**

Any time a connection is not possible or lost because of LimesControl is either not been started, has been terminated or is hung-up in a measurement, a message appears indicating that the communication transfer failed.

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Transfer without success

There has been no reply from LimesControl.exe within on request of this program.

Make sure that both programs are started and the settings in the Program Options for the connection are properly set.

O.K.
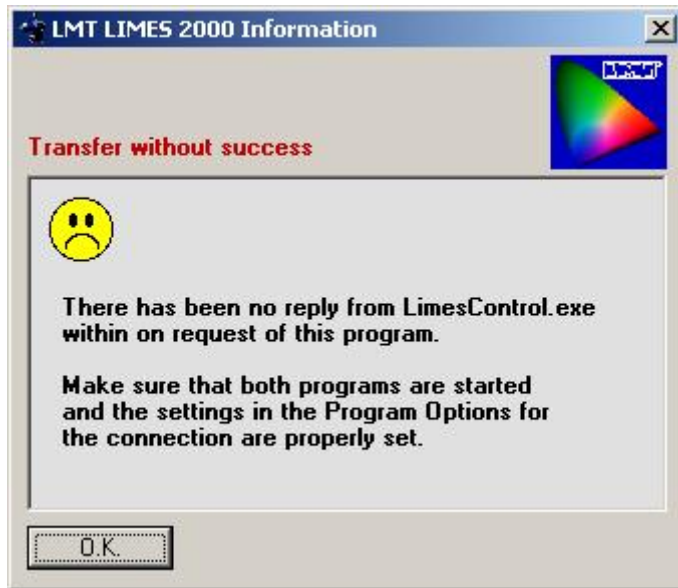
Control goniophotometer

This item can be accessd by a sub-menu from the Limes hardware menu.

The new **Control Goniophotometer** form allows flexible control possibilities for the connected goniophotometer. It is replacing the former **Move Goniophotometer** window.

The **Control Goniophotometer** form can be accessed by several LIMES menus, which allowed the moving of the goniophotometer into various positions
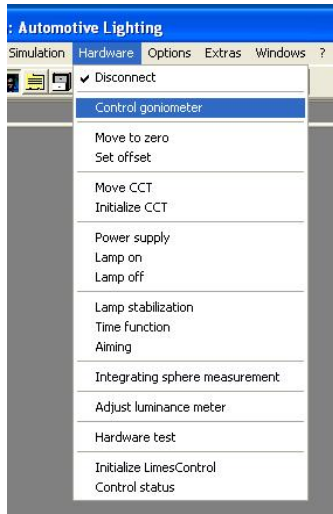
The **Control Goniophotometer** form can be resized in different sizes, and allows several different possibilities of control. You can use the **Details** button to change the sizes.

First size:

The first size allows reading of any connected photometer to the system.
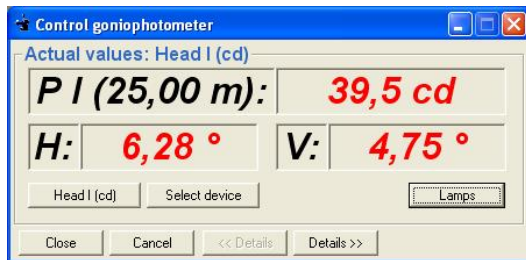
By clicking on the **Select device** button you can select the photometer from which you want to read by use of a pull down menu.

Here you can select the photometer which you want to read

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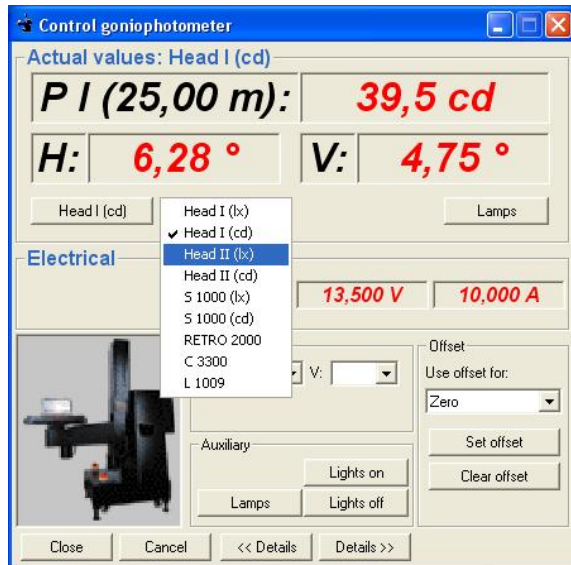
Head 1 [cd]: Use this button to perform another reading with the lastest selected photometer or colorimeter

Lamps: Use the Control Powersupply window to set electrical values

Close: Terminates an closes this window

Details >>: Enlarge the window to the second size

Second size:

The second size allows additional reading of electrical instruments, if available.
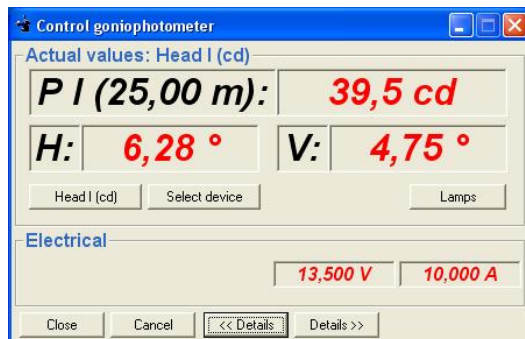
<< Details: Reduce the window to the first size

Details >>: Enlarge the window to the third size

Third size:

The third size allows various controls of the goniophotometer movement by entering values for angles, or setting auxiliary functions.
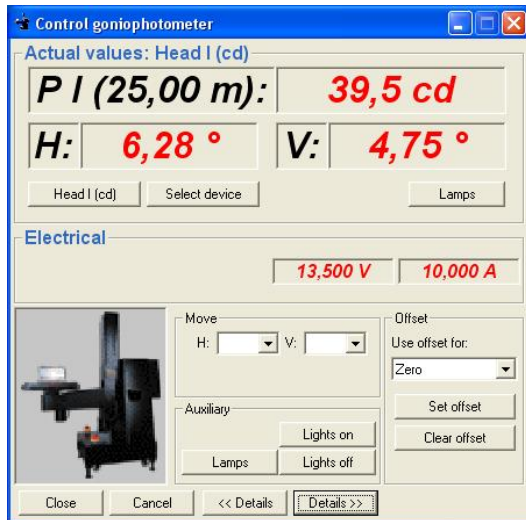
Lamps: Use the Control Powersupply window to set electrical values

Lights on: Turns laboratory lights on (must be available in the hardware options)

Lights off: Turns laboratory lights off (must be available in the hardware options)

Set offset: Allows to set an offset angle at the actual goniometer or any other position

Clear offset: Clears the offset angle

Fourth size:

The fourth size allows graphic goniophotometer control. You can click onto the angular grid to select a destination position, or double click to move the goniophotometer into this position

Move: Click here to move the goniometer to the position as shown in the angle fields at the left side of this button

-90 – V: This and the other buttons move the goniometer into the position printed on the label of the button

Scale: Click and drag the scale on the right side of the graphic to change the viewing angle of the graphic

0/0: Changes sizes to default

By clicking on the **arrow icon** you can toggle the form size between horizontal and vertical arrangement.

The red dot marks the actual position of the goniophotometer
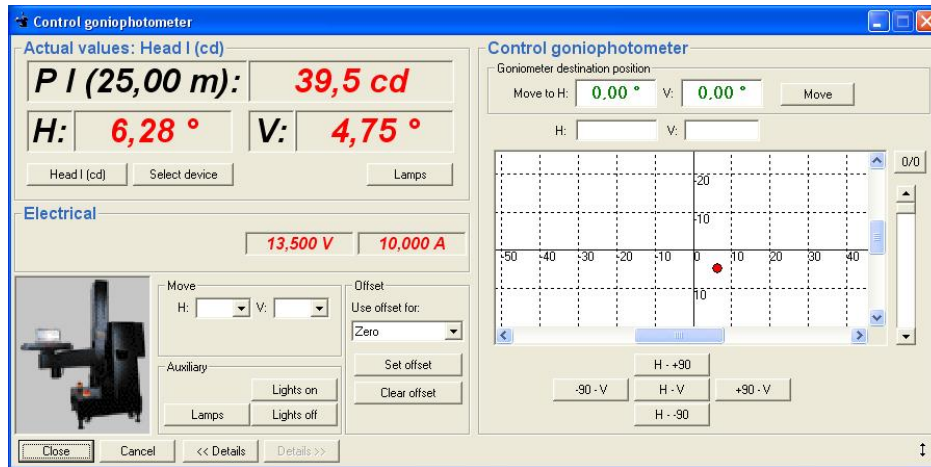
After terminating the **Control Goniophotometer** form the last size and position as well as the last selected head is saved and automatically applied if you open the form the next time.

> *Note:*
>
> *You do not need to close the Control Goniophotometer window if you want to continue with the LIMES program. If you minimize it, an icon appears in the Windows task bar which allows you to re-size the form back to the last size.*

Power supply

This item is a sub-menu item of the Limes Hardware menu. The power supply control window appears. It can also appear during program execution, when the setting is enabled in the program flow.
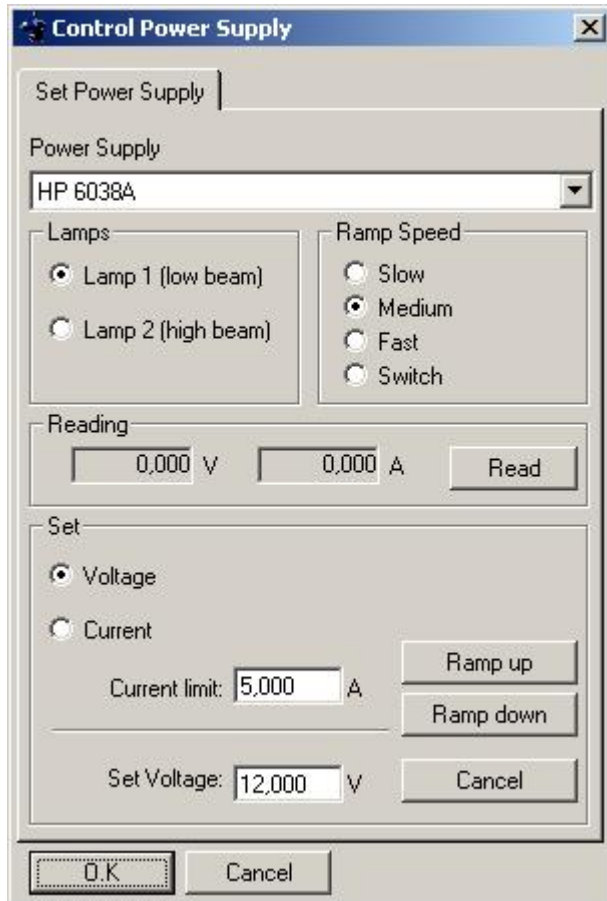
To see the explanation of this window go to the control power supply window description of the LimesControl section of this manual

Lamp on/off

This items are sub-menu items of the Limes Hardware menu.
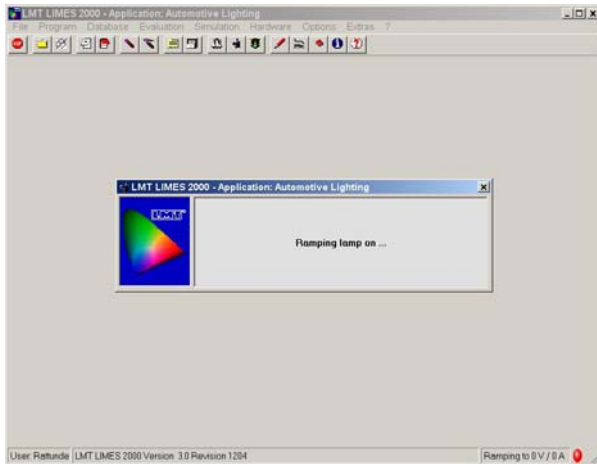
Lamp on : Switches (ramps) the lamp on with the preset electrical values of the actual lamp of the actual test sample data

Lamp off: Switches (ramps) the lamp off. If available the used total burn time is saved into the lamp database.

Lamp stabilization

This item is a sub-menu item of the Limes Hardware menu. The power lamp burn-in window appears. It can also appear during program execution, when the setting is enabled in the program flow.
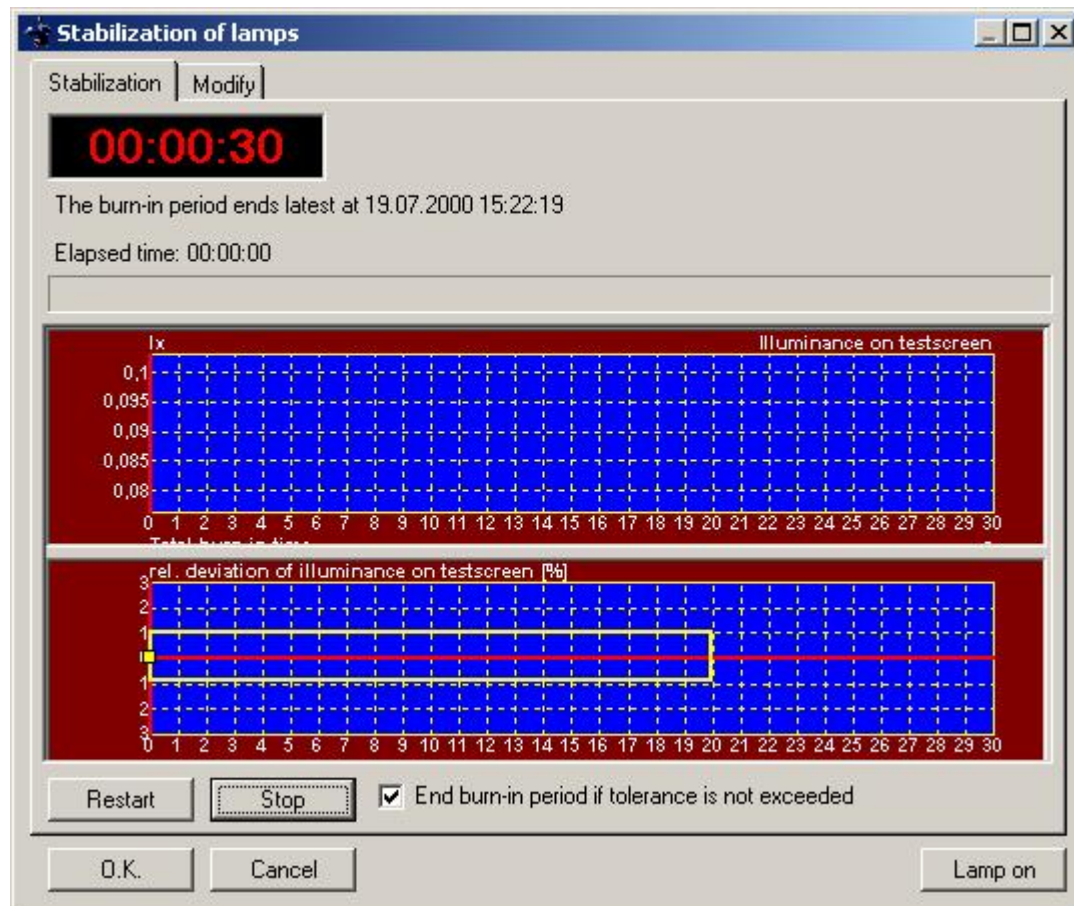
This window can be resized

Time display: On the top left corner of this window appears a time display showing the selected maximum stabilization time. This time display performs a countdown when the stabilization is started.

The burn-.in period ends: This shows the latest time when the stabilization ends, if the stabilization tolerance is not exceeded.

Elapsed time: Displays the elapsed time during stabilization in hours:minutes:seconds

Status bar: Indicates the elapsed time as a status bar.

Upper graphic: The diagram shows the time function of the measured photometrical values (e.g. lx or cd). The horizontal scale is the time, the vertical the photometric value.

Lower graphic: This diagram shows the time function of the measured photometrical values as deviations against the first value. The horizontal scale is the time, the vertical is divided in percentages, which are multiples of the deviation tolerance by the factor

Restart: Starts the measurement.

Stop: Stops the measurement. The measurement stops automatically when the tolerance is not exceeded within the given tolerance time period, if enabled (see next item). If the tolerance is exceeded, another tolerance time period is measured

End burn-in period if the tolerance is not exceeded: This enables the automatic stop

O.K.: Stops the measurement and terminates

Cancel: Cancels the measurement and terminates

Lamp on: Displays the control power supply window to set lamp voltage or current

Modify

This tab on top of the window shows the window to modify the settings for stabilization.
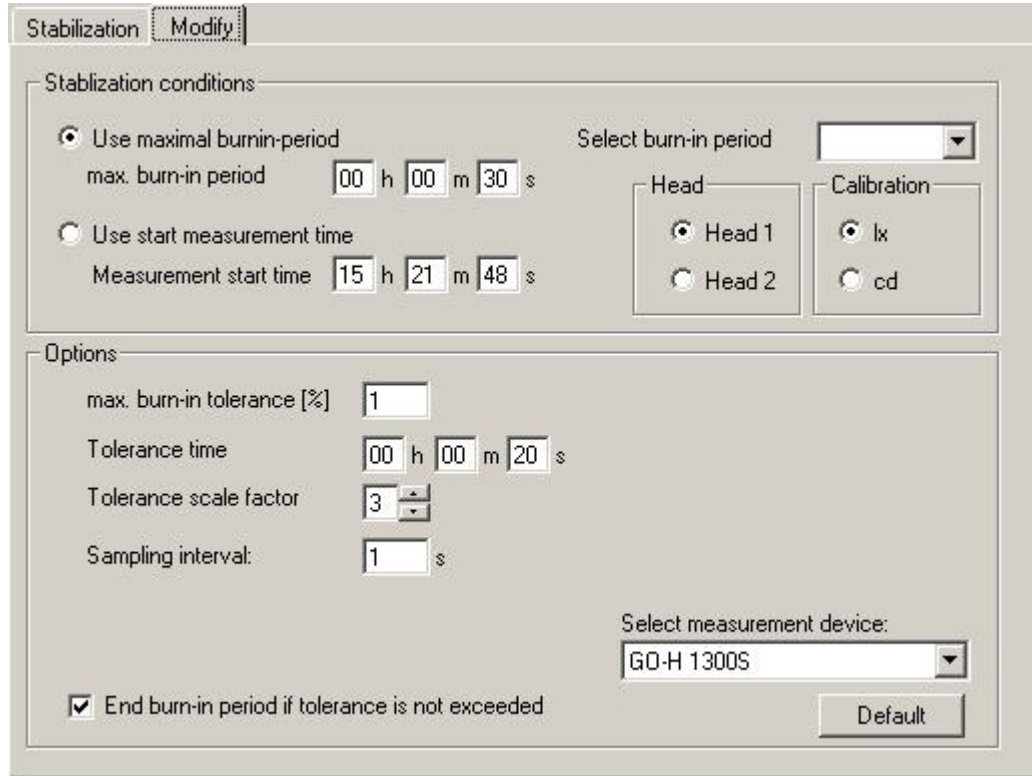
Stabilization conditions: Modify the actual values

Use maximal burn-in period: The measurement starts at clicking on the re-start button and lasts for the maximum time as entered here

Use start measurement time: Instead of entering a maximum period you can enter the time on which the stabilization shall be finished. The maximum time is then calculated from the time difference between the start measurement time and the clicking of re-start.

Select burnin period: Simplifies the input by selecting from a pre-defined list instead of entering hours, minutes and seconds

Head: Select photometer head to be used for stabilization, if more than one

Calibration: Select stabilization in lx or cd

Options: Enter more parameters

Max burn-in tolerance: Enter the tolerance in %

Tolerance time: The time for which the deviation of photometric value from first reading is checked

Tolerance scale factor: The multiplier defining the vertical scale of the lower graphic in the burn-in diagram. The scale covers this value times the tolerance value in % in negative and positive direction

> *Example:*
> *If you enter 1 % for tolerance, and tolerance scale factor of 3, the vertical scale on the lower diagram goes from –3 % to +3 %*

End burn-in period if the tolerance is not exceeded: This enables the automatic stop (identical to the item on the page before)

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Select measuring device: Select a device, if different devices could be used for stabilization test (e.g. integrating sphere, colorimeter, luminance meter)

Default: Overwrites the values in these window, which max be defined with the test samples lamp, with the default values defined in the Limes program options

Integrating sphere measurement

The measurement of luminous flux of a lamp with an integrating sphere can be started by using the Integrating sphere measurement menu, which is part of the Hardware menu of the LIMES main menu.

If no goniophotometers are available in the system, the sphere measurement can be started also from the Execute menu, which is part of the Program menu of the LIMES main menu, or by the Execute icon on the LIMES main toolbar.

A scalable window is displayed which contains 3 possible tools to operate the measurement:

- ❑ Menu bar
- ❑ Toolbar
- ❑ Buttons
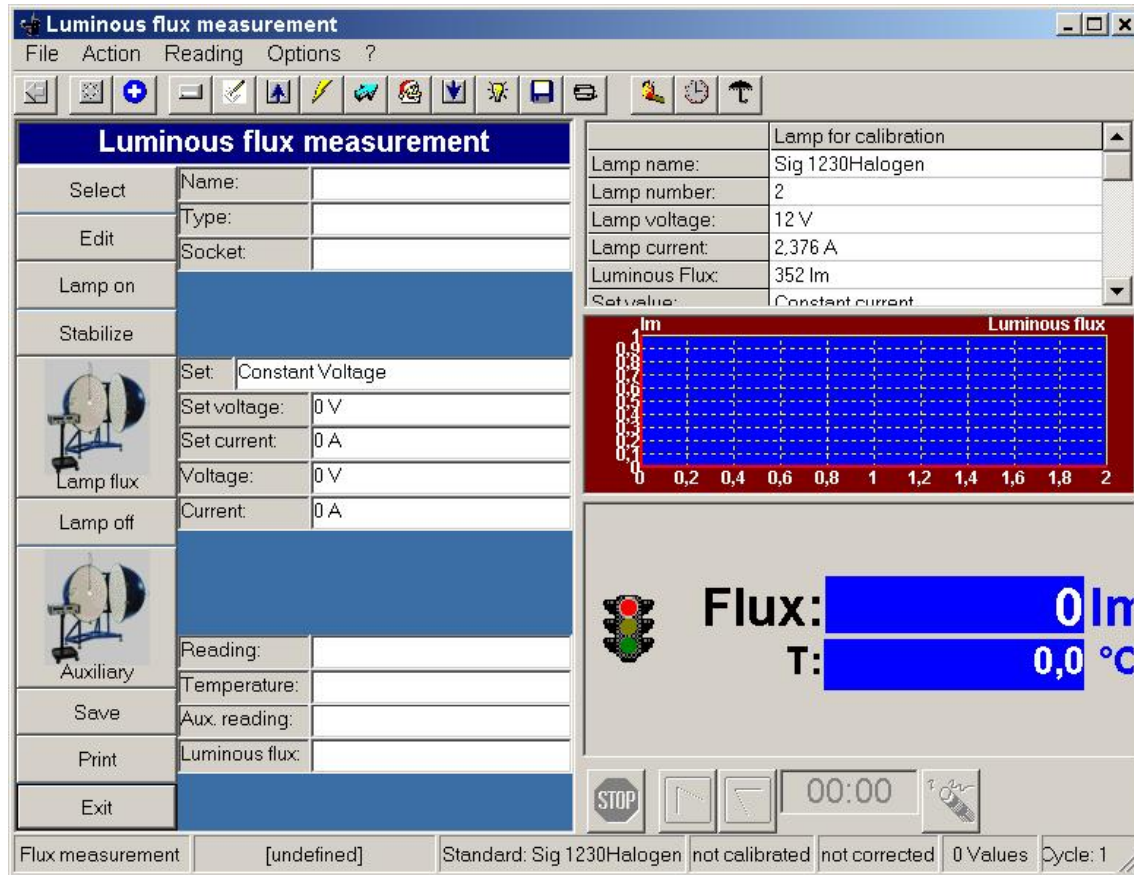
The **menu bar** is on top of the window.

The **toolbar** is shown below the menus.

The **buttons** are lined up vertically on the left side of the window

The **result table** is presented on the left side of the window

The **lamp description** is found on the top right part of the window and can be hidden

The **graphic area** can show time functions of flux or temperature, as well as flux versus temperature diagrams

The **actual measurement** is displayed with the temperature in the lower right part of the window

The **recording tools** are shown on the right lower part of the window

The **status bar** shows the main actual parameters

General procedure

- ❑ Calibrate the sphere by selecting a standard lamp from the lamp database
- ❑ If necessary, measure the lamp flux of the standard lamp
- ❑ If necessary, measure the auxiliary lamp with the standard lamp turned off
- ❑ Select and edit the test lamp you want to measure
- ❑ Turn the lamp on and stabilize
- ❑ Measure the luminous flux
- ❑ Save the flux into the test lamp database
- ❑ Print the luminous flux report

Adjust luminance meter

This function is available to adjust the luminance meter mounted to the goniophotometers mounting table to the zero target of the test area, usually for license plate lamp measurement. Actually you can measure the luminance distribution of any luminant area, but this function was developed basicly for license plate lamp testing, as assumed in the following instructions.

Procedure

The luminance meter is mounted to the goniophotometers mounting table using the fixing device supplied with the system. The pointer pin of the fixing device has to be set into the center hole of the table, and fixed with the screws. The default offset position should be set in the luminance meters hardware options. The default position is set in a way, that the measuring field of the luminance meter hits the center target of the license plate holder.

Due to tolerances of the fixing device, it may happen that after fixing the luminance meter the measuring field is slightly shifted out of the target area. If this is just a couple of mm, the following procedure can be usewd for fine adjustment. Otherwise the offset position should be corrected in the hardware options.
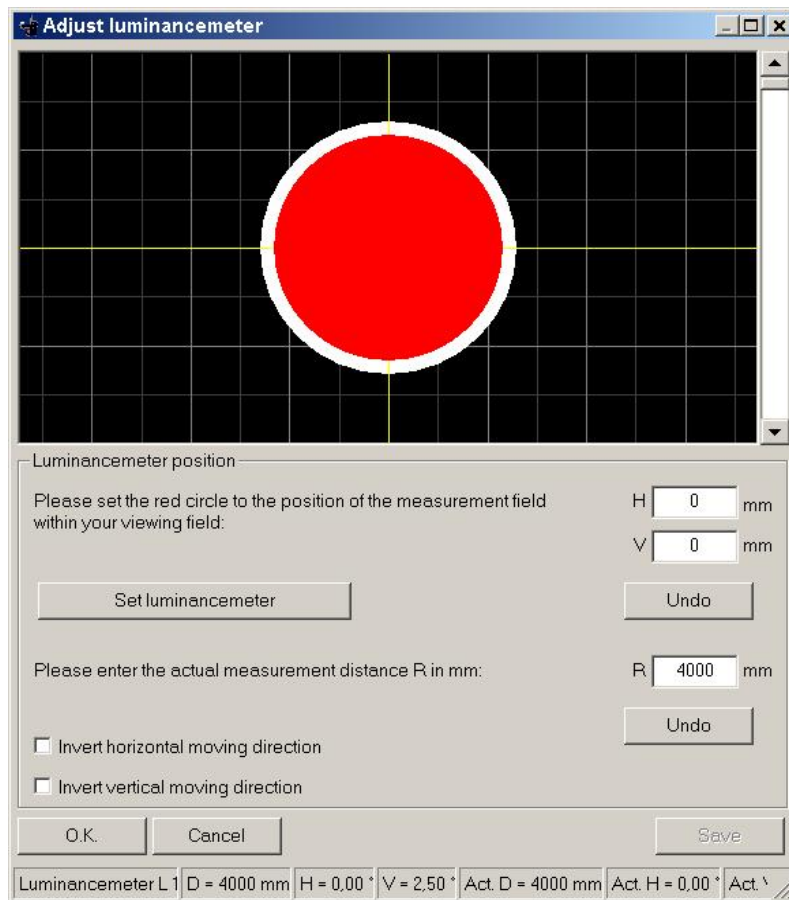
Procedure of fine adjustment

The graphic indicates the measuring field of the luminance meter (red circle) lying in the center of the target area (white circle). In case of disalignment the measuring field would be shifted out of the center. This can be checked either by visual checking (looking through the ocular and observing the position) or using the LED device supplied with the luminance meter. Set this device onto the ocular, connect it to the supply (the small socket at the goniophotometers tablke movement control panel) and observe the position of the red LED spot on the license plate.

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Note:
You will have to turn off the ambient light to get a good view

Now estimate the deviation of the measuring field from the center. Use the mouse, and drag the red circle into the same position as you see the luminance meters measuring field. You can also enter the deviation in the H/V input fields below the graphic. These values will also change if you drag.

You can use the slider on the right side of the graphic to adjust the viewing scale:
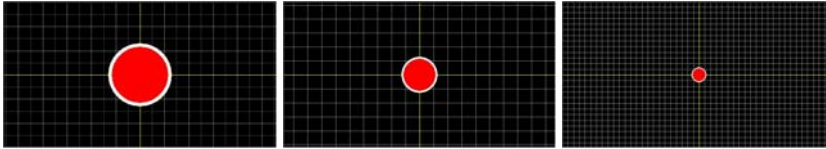
Use the slider to change the scale of the graphic

When dragging, the graphic looks like follows:
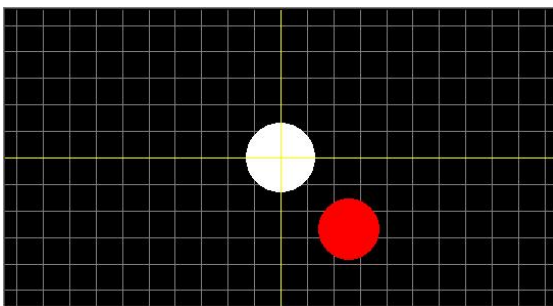
The offset of the measuring field is shown as follows:

When you see the red circle in a position which matches the position of the luminance meters measuring field on the target, click on Set luminance meter. The goniophotometer now moves the luminance meter into a position, which corrects for the offset. After stopping of the goniophotometer you can visually check the measuring field position again.

If the field is still out of target, because you shifted it too less or too much, you can repeat the procedure from the actual position.

If your luminance meter was moved by the goniophotometer into the opposite direction as you intended, use the invert direction check boxes to correct this.

You can undo all offsets if you click on the Undo button below the H/V input fields

Change test distance

If the test distance (measured from the luminance meters optical center to the target center of the license plate holder) is different from that what is entered in the luminance meters hardware options, it can be changed here as well. Enter the accurate distance in mm into the R field

> *Note:*
> *The values in this window can be saved to overwrite and correct the setting in the hardware options*

Terminate by O.K. or Cancel if you want to exit from this window.

> *Note:*
> *The cancel button does not cancel settings once you saved them*

Hardware test

This item is a sub-menu item of the Limes Hardware menu. It is used to test individual functions of the hardware, as in the same item in the LimesControl program, but under remote control from Limes.
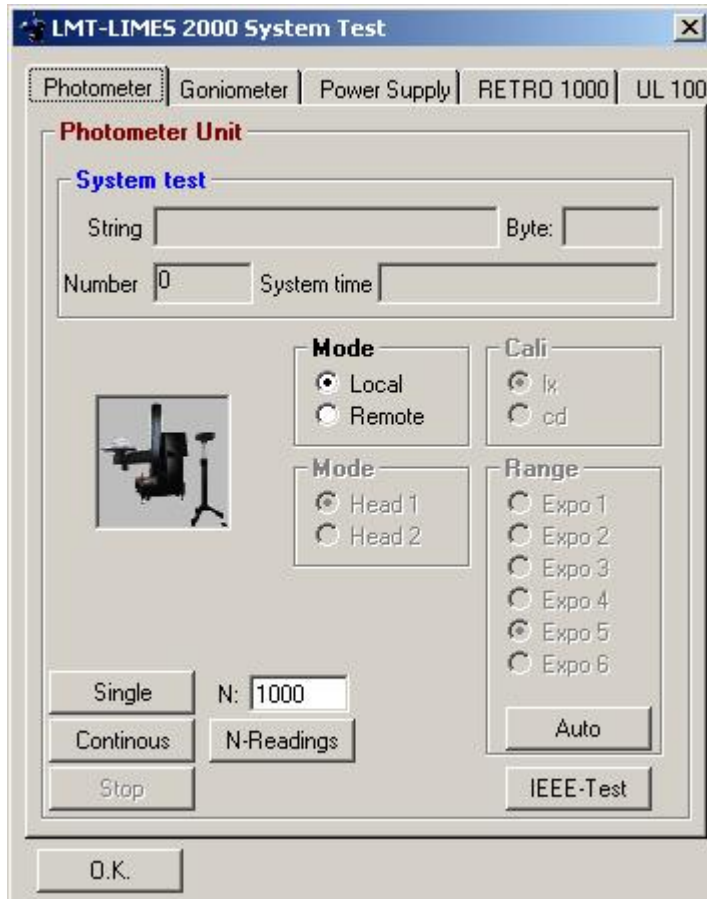
For explanation see

Hardware test (LimesControl)

Move to Zero

This item is a sub-menu item of the Limes Hardware menu. It is used to move a connected goniophotometer back to the Zero position.

Initialize LimesControl

This item is a sub-menu item of the Limes Hardware menu. It is used to initialize the LimesControl program.

Initializing LimesControl forces the connected program to read the settings from the configuration file (ini-file) and the Windows registry, when modifications have been made in the corresponding Limes hardware options menu.

> *Note:*
> *LimesControl will be initialized automatically, if modifications are made to the hardware settings while LimesControl is connected to Limes.*

Connection status

This item is a sub-menu item of the Limes Hardware menu. It is used to check the status of the connection between Limes and LimesControl program
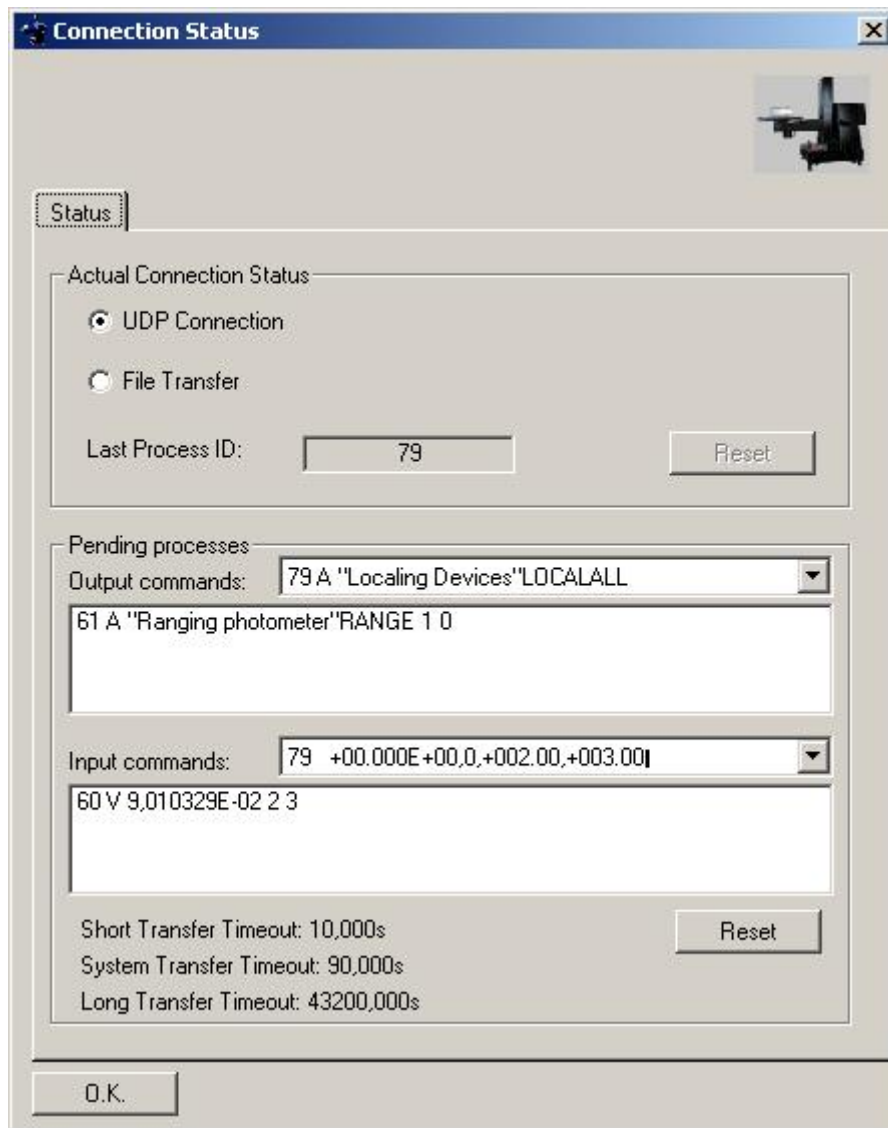
Actual connection status: Displays the active connection type UDP connection or file transfer. The selection cannot be made here but in the Limes option menu item Program/Connections.

Last process ID: Each communication between Limes and LimesControl consists of a process ID, which is a long integer counter (a numerical value ranging from 1 to 1.000.000.000). The process ID is followed by a text string created by a row of characters and figures depending on the command. Any output from Limes to LimesControl is replied by LimesControl with an input string with the same process ID.

Pending processes: This shows eventually still pending processes (Limes is still waiting for the reply of LimesControl) as well as the list of last output and input strings.

Transfer timeout: This shows the actual setting. Can be modified in the Program options: Connections settings window.

Reset: Resets the process ID to Zero and clears pending processes.

O.K.: Terminates the window

Evaluation

Export program as ...

This item is a submenu item of the program menu of the Limes Main Menu.

This items is used to export test programs into external ASCII files in on of the available LMT LIMES 2000 file formats.

Diagrams

Evaluation

This item is an menu item of the Limes Main Menu.

This menu item is used to evaluate test results in a test sample data file by producing diagrams and tables or displaying bitmap graphics on the computer screen. Diagrams and tables can be modified both in layout and content and can be printed or saved into files.

Evaluation is only possible if at least on test sample data file is loaded into the computer memory which contains at least one light distribution.

The evaluation menu shows 3 menus in the following way:

This image contains hot spots

Graphics: Displays the graphics submenu with a list of available types of diagrams

Tables: Displays the tables submenu with a list of available types of tables

Show pictures: Displays the Show pictures window.

A certain diagram or table type can only be selected if the light distribution data matches with the requirements of the diagram or table(e.g. a color diagram can only be displayed if the light distribution contains information not only of all intensity values, but also all tristimulous values X,Y,and Z).

Valid tables and diagrams (tables and diagrams which can be created from the actual test sample data file) are listed in submenus to the evaluation menu.

Tables and diagrams which cannot be created from the actual test sample data file are grayed out in the sub menus.

> *Note:*
>
> *The order of appearance of the available diagrams or tables as submenus can be changed in the main menu options, submenu Program, tab Orders.*

Printer

The diagram options window can be accessed from the graphics evaluation window by clicking on the Diagram button on the left side.

The settings in this window only apply when the graphic is sent to a printer.

Show page frame: If checked a frame with the selected frame color is drawn around the whole page

Show text field (portrait): If checked the text field with test sample data is displayed on the bottom or top of the diagram window for portrait page format

Show text field (landscape): If checked the text field with test sample data is displayed on the bottom or top of the diagram window for landscape page format

Special graphics options for iso-diagrams

The special graphics options window can be accessed from the graphics evaluation window by clicking on the Options button on the left side. For an isoline diagram the following window appears:

Show iso-lines: If checked the iso-lines defined by the iso-system with the name displayed behind the check box are displayed. The number of lines in this iso-system are displayed additionally for your information

Show gray scale: If checked the areas of a certain level defined by the iso-system with the name displayed behind the check box is displayed in a selected color as defined by the iso-system. The number of lines in this iso-system are displayed additionally for your information

Show test program: If checked the functions of a test program with the name displayed behind the check box are displayed within the diagram. The program library is displayed additionally for your information

> *Note:*
>
> *The last three items (Show iso-lines, gray scale and test program) naturally are only visible and can be selected, if the selected diagram in the general section allows this feature. E.g. an intersection diagram cannot contain iso-lines.*

Select: Click here to select or modify the corresponding items

OK: Accept the selection and continue

Cancel: Throw away all modifications and continue

Special graphics options for Intersections HV

The special graphics options window can be accessed from the graphics evaluation window by clicking on the Options button on the left side. For an intersection diagram in HV-co-ordinates (with a goniophotometer for automotive lighting) the following window appears:
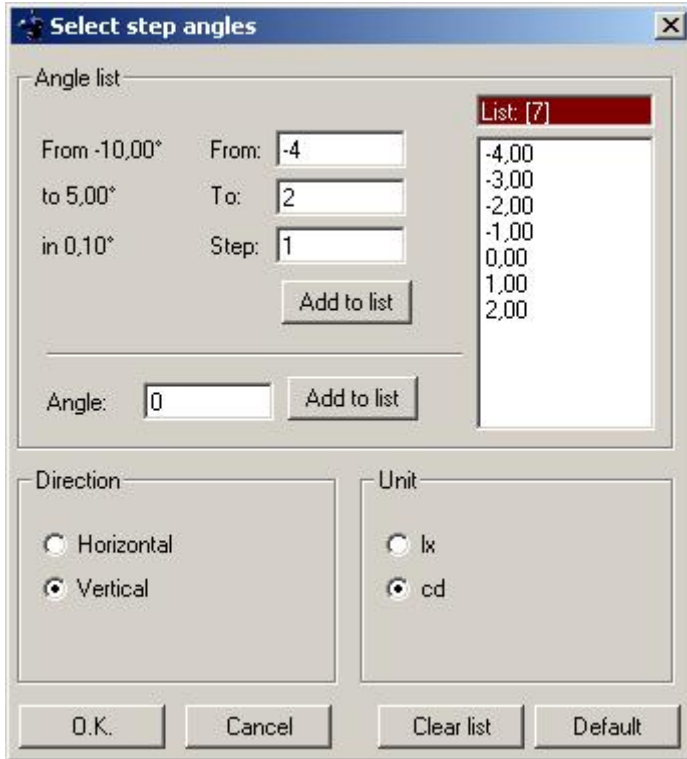
Angle list: Allows to enter a list of intersection either horizontally or vertically. The available angles given by the actual light distribution are shown on the left

From: Start angle for intersections

To: End angle for intersections

Step: Step angle for intersections

Add to list: The intersections entered on the left are calculated and added to the intersection list

Angle: You can enter an individual angle to be shown as intersection

Add to list: The individual angle is added to the intersection list

Direction: Select either horizontal or vertical intersection

Unit: Show either intersections as illuminances or intensities

Clear list: Clears the intersection list

Default: Resets the list to default values

O.K.: Terminates and applies the list to the diagram

Cancel: Throws away the input and terminates

Special graphics options for color diagrams

The special graphics options window can be accessed from the graphics evaluation window by clicking on the Options button on the left side. For a CIE color diagram the following window appears:
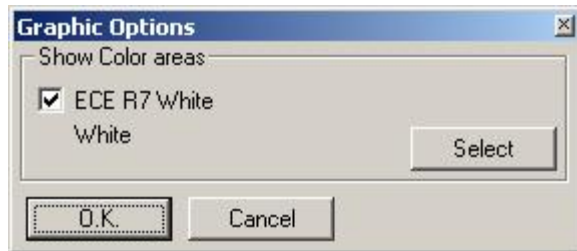
Diagram options

Graphics

After selecting one of the valid diagrams in the graphics submenu the graphic evaluation window appears.
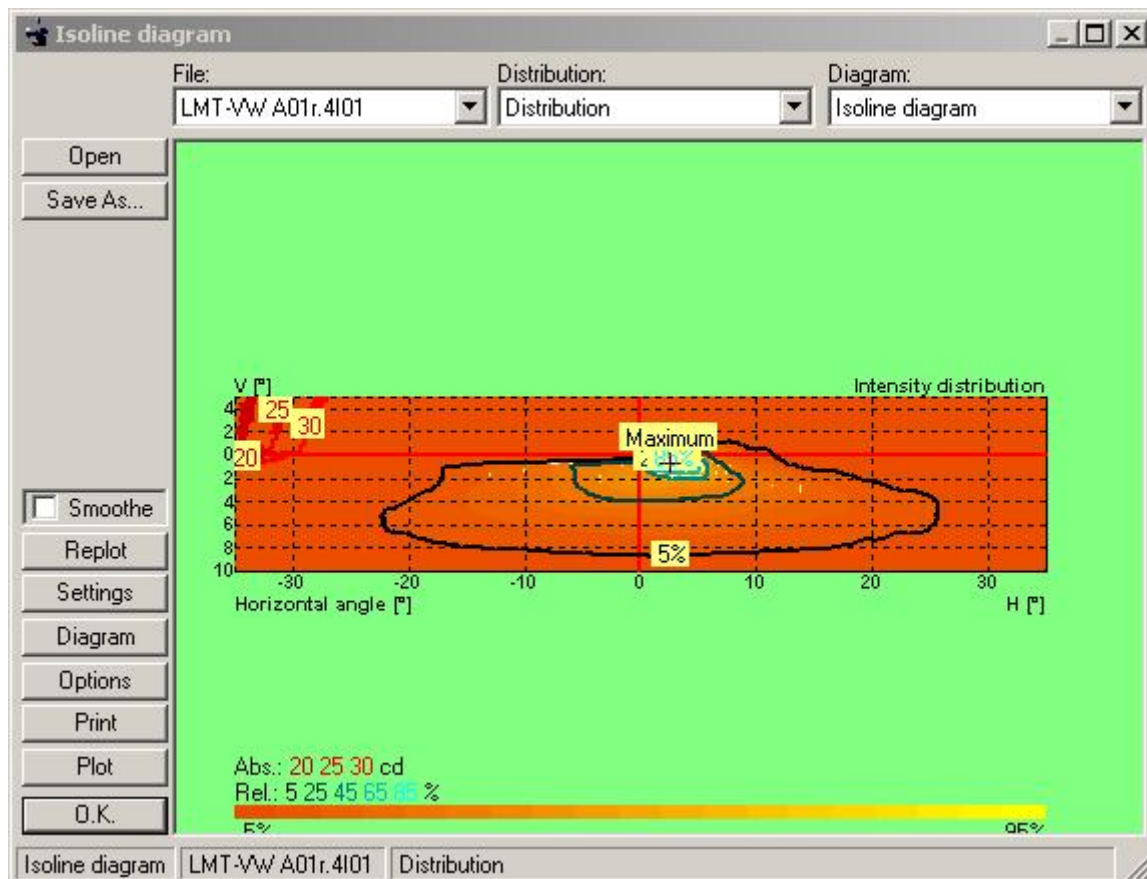
This window can be resized up to full screen. The appearance and meaning of the option buttons on the left side of the window depends on the selected type of diagram

File: Allows the selection of one of the opened test sample data files of the stack of opened files

Distribution: If a file contains more than one distribution, a selection can be made

Diagram: The type of evaluation diagram can be selected

Open: Loads a bitmap file and displays it in the window. Bitmap files cannot be modified with the option buttons on this window

Save: Saves the actual diagram into a bitmap file to the hard disk

Smoothe: Smoothes the diagram by actual performing a 2-dimensional spline interpolation on the actual measurement values of the test results.

Replot: Shows a clipped area of the diagram if selected

Settings: Selects the start options window for graphical settings for all types of diagrams. Allows to configure the layout of this type of diagram generally

Diagram: Selects the options window for graphical setting for this type of diagram

Options: Allows the optional display of results in the diagram. Example for isoline diagrams are different sets of isolux values

Print: Prints the diagram after showing the printer options

Plot: Re-plots the diagram in full scale, disregards any clipping

O.K.: Back to the Limes main window

Status bar: Displays the diagram type, file name and distribution name

Clipping

The user can clip a smaller area within the diagram to zoom this area to the full window size. For this a rectangle has to be drawn within the diagram by dragging with the mouse.

Note:

To view the clipped area click on the Replot button. A new clipped area can be selected by repeating the clipping procedure as often as desired

Examples for clipping:
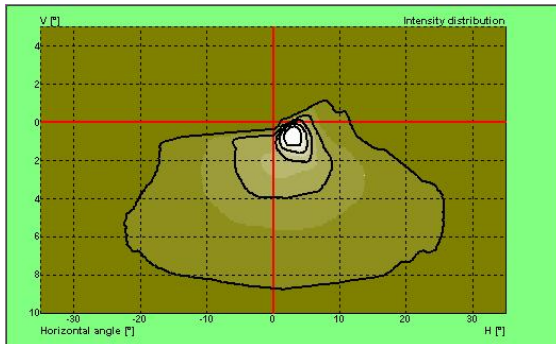
Isolux diagram (full view)
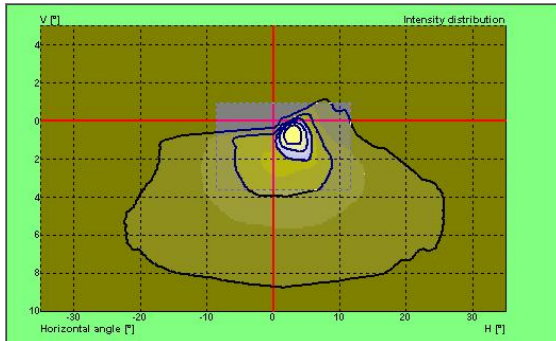
Isolux diagram with clipped area
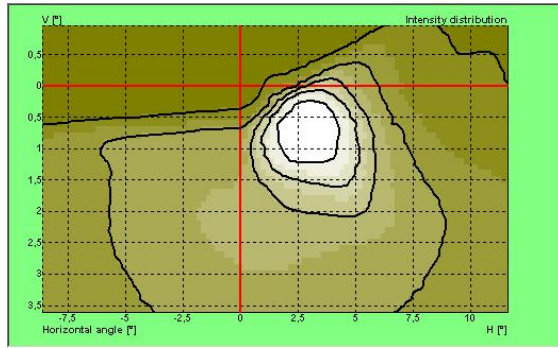
Isolux diagram clipped area after selecting Replot

Diagram options: General

The diagram options window can be accessed from the graphics evaluation window by clicking on the Diagram button on the left side.
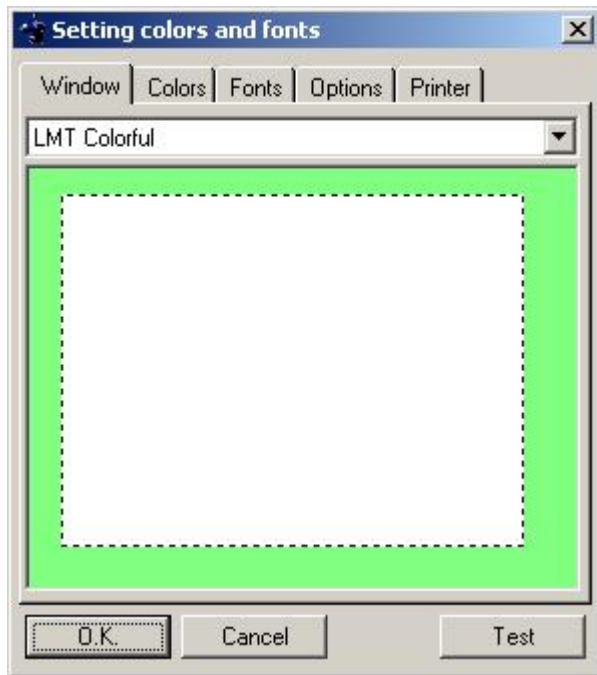
The graphics shows a rectangle which demonstrates the size of the diagram relatively to the window. Change this size with the border settings in the graphics options

Scheme: Select an existing configuration from the list. Graphics configurations can be modified in the graphics options settings.

OK: Accept any setting an apply it to the actual diagram

Cancel: Throw away all modifications and continue with the actual diagram

Test: Apply the modifications to the actual diagram for testing (not permanently)

Colors

The diagram options window can be accessed from the graphics evaluation window by clicking on the Diagram button on the left side.
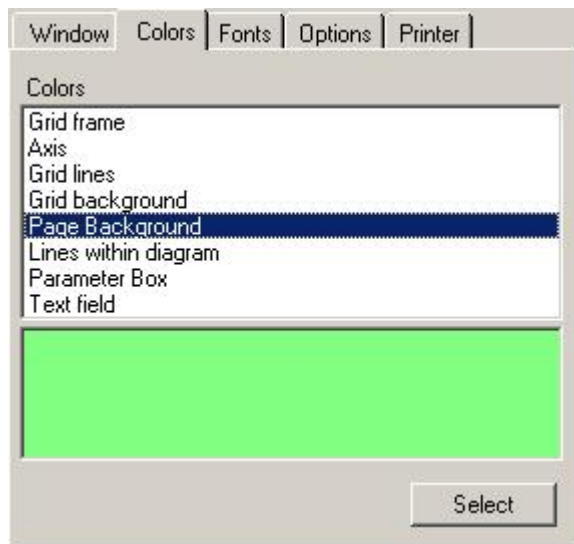
Select: Click on the name on the list

Modify: Click on the select button

Fonts

The diagram options window can be accessed from the graphics evaluation window by clicking on the Diagram button on the left side.
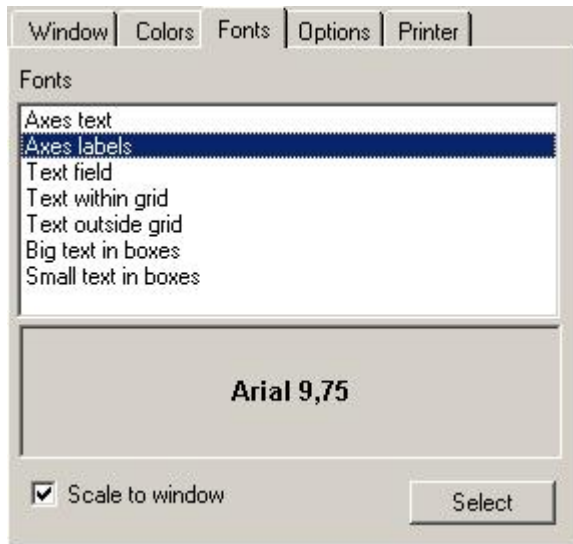
Select: Click on the name on the list

Modify: Click on the select button

Scale to window: Show any text in a size relative to the window size

Options

The diagram options window can be accessed from the graphics evaluation window by clicking on the Diagram button on the left side.
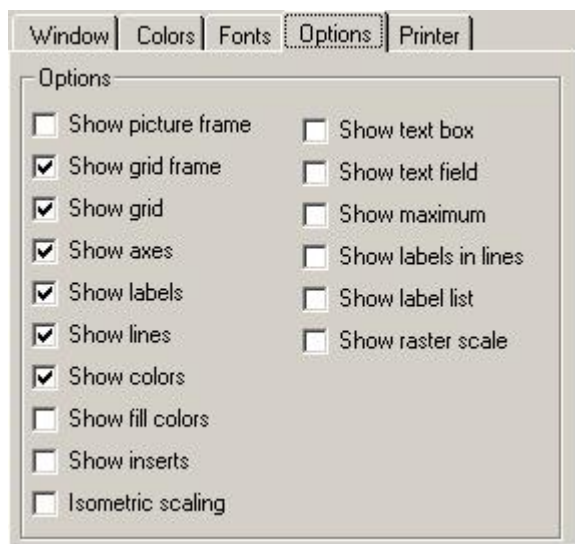
Show picture frame: If checked a frame with the selected frame color is drawn around the whole picture

Show grid frame: If checked a solid frame is drawn around the diagram in the selected style

Show grid: If checked the grid lines of the diagram are drawn in the selected style

Show axes: If checked the axes lines of the diagram are drawn in the selected style

Show labels: If checked the labels marks of the diagram are drawn in the selected style

Show lines: If checked the additional lines in the diagram are shown in the selected style

Show fill colors: If checked areas draw within the diagram are displayed filled with a certain fill color.

Show inserts: If checked the addition features like a selected test program is displayed

Isometric scaling: If checked the diagram is drawn with isometric scales, other wise distorted

Show text box: If checked a text box is shown in the selected style within the diagram (certain selected diagrams only)

Show text field: If checked a text field with the description of the test sample is shown in the selected style within the diagram (applies only to certain diagrams)

Show maximum: If checked the location of maximum is shown in certain diagrams

Show labels in lines: If checked the iso-values are displayed within the iso-line (in a isolux or isocandela diagram only)

Show label list: If checked the iso-values are displayed in a list outside the diagram (in a isolux or isocandela diagram only)

Show raster scale: If checked the iso-values for a grayscale or color scale are displayed in a scale outside the diagram (in a isolux or isocandela diagram only)

Tables

Special graphics options for isocolor diagrams

The special graphics options window can be accessed from the graphics evaluation window by clicking on the Options button on the left side. For an iso-color diagram the following window appears:
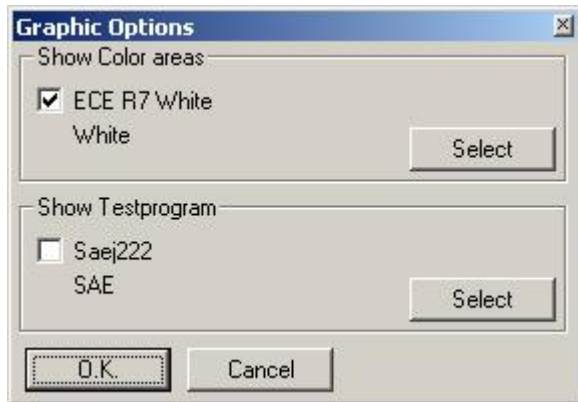
Tables

After selecting one of the valid tables in the tables submenu the tabular evaluation window appears.

This window can be re-sized

File: Select one of the available files loaded from the test sample database

Distribution; Select one of the available light distributions in the selected file, if more than one is available

Table: Select the table for evaluation

Show Min: Click on this button. The minimum value in the distribution is moved into the visible field, and appears with the selected 'minimum' color. (See Limes Options menu program/diverse to assign colors)

Show Max: Click on this button. The maximum value in the distribution is moved into the visible field, and appears with the selected 'maximum' color. (See Limes Options menu program/diverse to assign colors)

>*Note:*

>*The Show min/max buttons are only visible if the table contains a light distribution*

Save As: The table can be saved into an ASCII file

Configure: Select the rows and columns of the table

Options: Select table display options, also for printing

Print: Print a report with the content of the table. The Printer setup window appears.

O.K.: Terminates the table evaluation

Cancel: Cancels all modifications and terminates

Table options

Configure tables

This window appears after clicking on the Configure button at the table evaluation window.

Horizontal angle list: Allows to enter a list of table columns. The available angles given by the actual light distribution are shown on the left

From: Start angle for columns

To: End angle for columns

Step: Step angle for columns

Add to list: The columns entered on the left are calculated and added to the angle list

Horizontal: You can enter an individual angle to be shown as a column

Add to list: The individual angle is added to the list of columns

Vertical angle list: Allows to enter a list of table rows. The available angles given by the actual light distribution are shown on the left

From: Start angle for rows

To: End angle for rows

Step: Step angle for rows

Add to list: The rows entered on the left are calculated and added to the angles list

Vertical: You can enter an individual angle to be shown as a row

Add to list: The individual angle is added to the list of rows

Clear list: Clears the angle list

Default: Resets the list to default values

Automatic list as default: Takes the values of the light distributions, shows all angles

O.K.: Terminates and applies the list to the table

Cancel: Throws away the input and terminates

Sample

This window appears after clicking on the options button at the table evaluation window.

There are several pages in this window to be selected by clicking on the tab on top of the window.

Any table options are saved as a configuration with a certain name into the options database.

The table options for the test sample data allow the modification of the layout of the sample description data on top of a test protocol.

Select scheme: Select a scheme from the available set of configurations
Delete scheme: Delete a scheme from the available set of configurations

> *Note:*

> *A scheme with the name LMT belongs to the system and cannot be deleted*

Save: Saves the modified configurations under the actual name
Save As: Saves the modified configurations under new name
Style: Select border styles for the table

Table

This window appears after clicking on the options button at the table evaluation window.

There are several pages in this window to be selected by clicking on the tab on top of the window, this is the second page.

This window is used to format data tables which are part of a test protocol (light distributions, zonal flux tables, etc.)

Printing

Table options: Format

This window appears after clicking on the options button at the table evaluation window.

There are several pages in this window to be selected by clicking on the tab on top of the window, this is the third page.

With the format options the decimal presentation of photometric and other data can be defined.

Select data format

Please select the number of decimals for presentation of photometric data:

Illuminances [lx]:	3	0,000
Intensities [cd]:	1	0,0
Luminous fluxes [lm]:	2	0,00
Luminances [cd/m2]:	2	0,00
Reflex [mcd/lx]:	1	0,0
Rel.Reflex [cd/lx/m2:	3	0,000
Reflex [cd/fc]:	2	0,00
Rel. Intensities[cd/klm]:	1	0,0

Printer setup

The printer setup window can be accessed after selecting to print a graphic or a table from the evaluation windows (graphical or tabular evaluations)

It can also be accessed after clicking on Printer setup from the Select reports window after clicking on the main file menu Print.
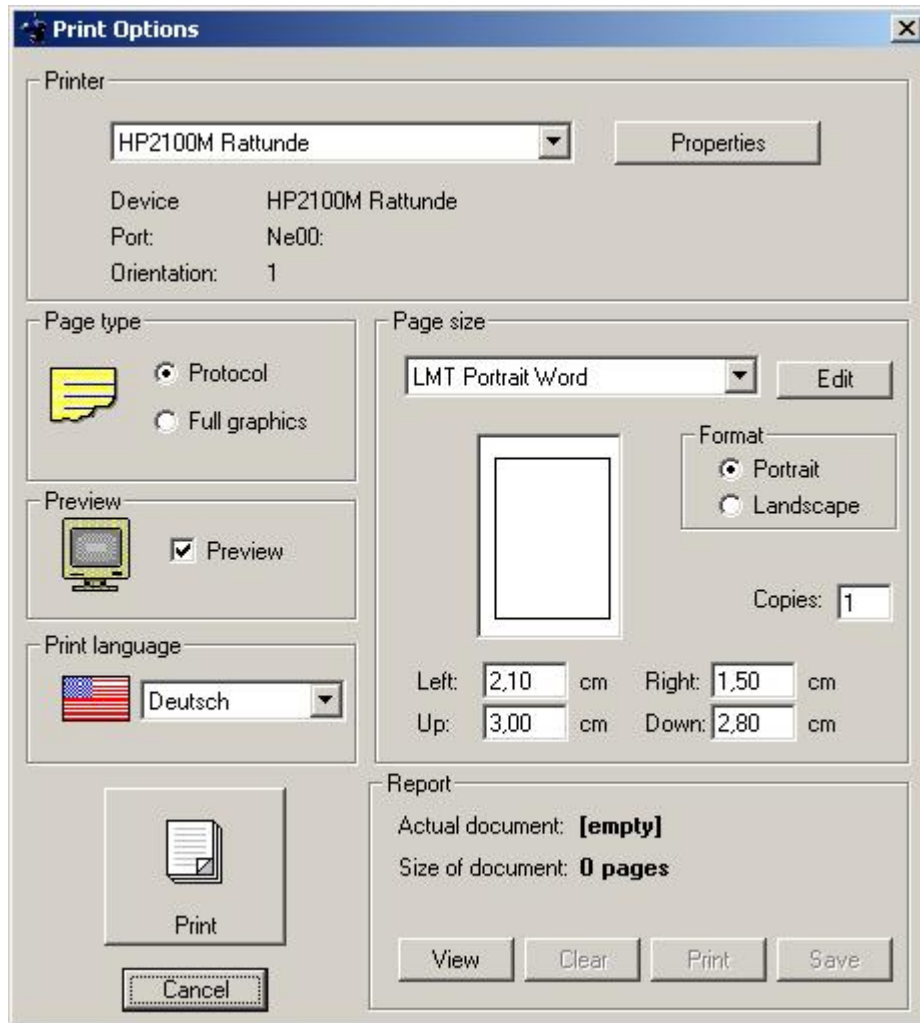
Printer selection

Printer: The active windows printer.

Device: The actual printer device name

Port: The actual printer port name

Orientation: The actual printer orientation

Properties: Click here to change the properties of the actual printer

After selection of a new printer the user may define this printer as the new Windows standard printer.
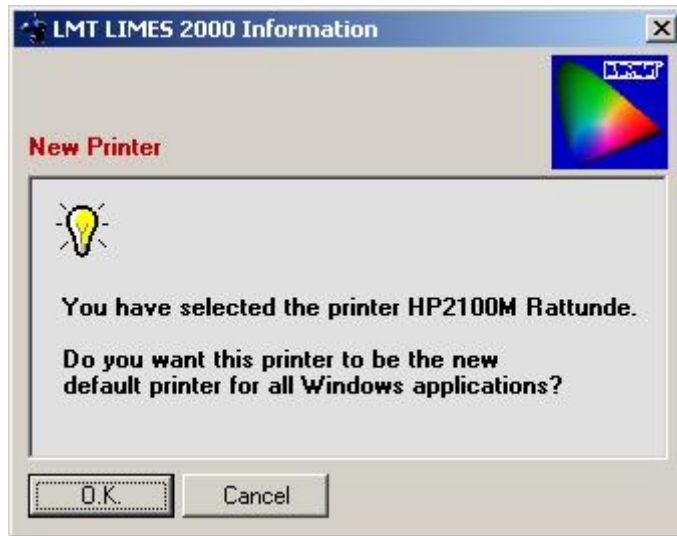
Select **O.K.** to confirm, **Cancel** if you don't want to use the new printer as the Windows standard printer.

Page type Protocol: The output page is like a protocol with header, sample or other description, and a graphic in a smaller size

Page type Full graphics: The output page contains only the graphics

Preview: The preview function of the virtual printer is on. Any printed page is directed to the virtual printer and can be pre-viewed before sending to the real printer

Print language: Select a valid language from the Items database language list

Page size: Define the printable area on the page by entering the margins **left**, **right**, **up**, and **down**.

Portrait/Landscape: Select the page orientation

Scheme: Select a scheme for a page from the list of available schemes

Edit: Create or modify a page scheme (page setup)

Copies: No. of copies created by the printer of any page

Report: Options for reviewing already send pages to the virtual printer

Actual document: The name of the actual document available in the virtual printer

Size of document: The number of pages of the actual document available in the virtual printer

View: Preview the actual document in the virtual printer now

Clear: Clear (delete) the actual document from the virtual printer

Print report: Print the document from the virtual printer to the real printer

Save: Save the actual document from the virtual printer into a document file

Print: Send the page to the virtual or real printer, terminate Printer setup

Cancel: Terminate Printer setup without printing

Translate

This item is a sub-menu of the Limes Extras menu

By selecting translate the LMT LIMES 2000 Translator program is started automatically.

Layout

This window can be accessed from the page setup window.

During layout any number of bitmaps can be defined and assigned at a certain location with a certain size on the page.

Files are valid Windows bitmap files either with the extensions (.jpg, .bmp,. gif,. .tif, etc.)
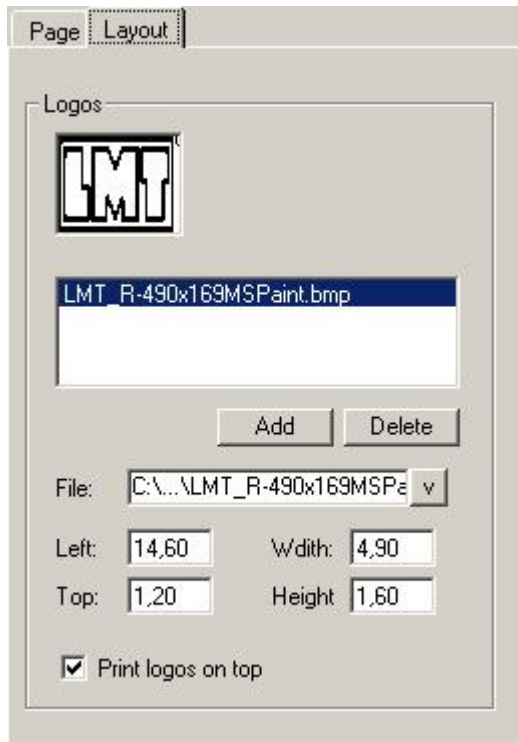
File: Select a file by clicking on the Select button. The file name appears in the field left from this button. The file is shown in the small picture on top of this window.

Add: Adds the selected file in the file name field to the page

Delete: Delete the selected file from the list

Left/Top/Width/Height: Size and location of the bitmap on the page in the selected unit

Print logos on top: Defines the order of printing. If checked, the logo is printed after the test protocol is printed. Any area of the bitmap will cover the protocol text. If not checked, the bitmap is printed first. Any printed text or graphic of the protocol will cover the bitmaps.

Select report

This window is displayed when you select Print from the Limes main file menu, or when you select reports from the Limes execute window.

You can either select a pre-defined scheme (configuration) of reports, or select individual pages to be printed. Additionally you can select various options for certain type of reports, or configure the printer.
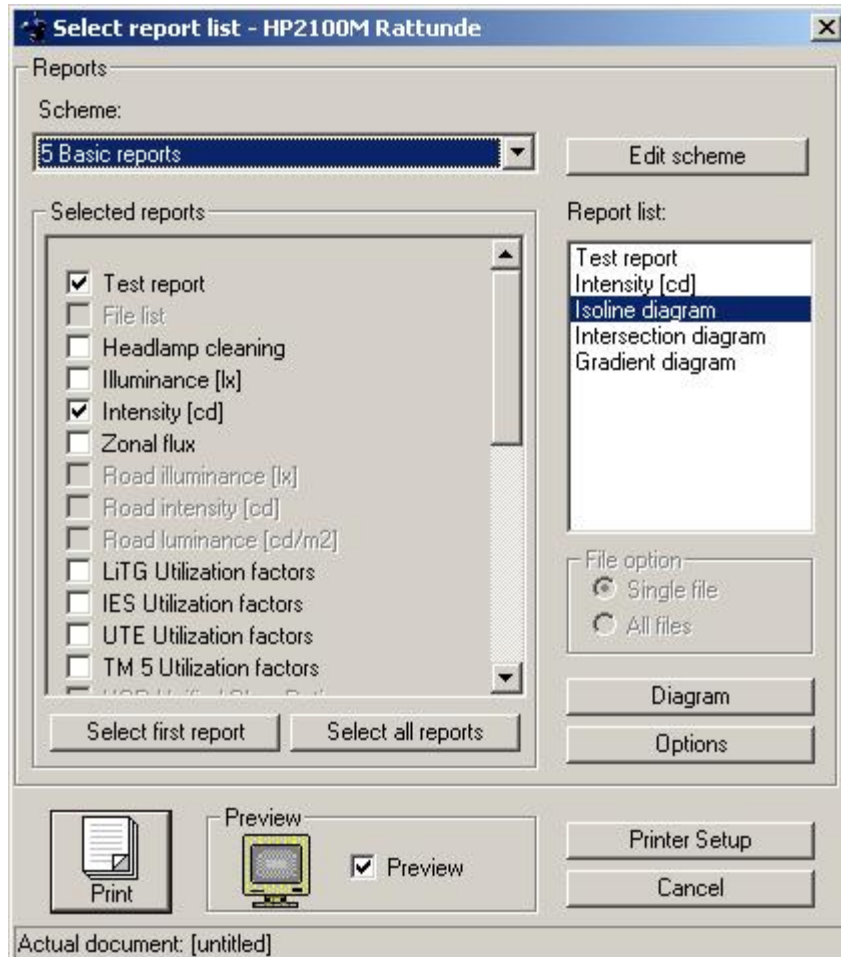
Scheme: You can select a pre-defined scheme from the options database. Schemes can alos be modified from the Configuration menu of the Limes options menu.

Edit scheme: You can edit (modify) a scheme, create a new or delete an existing scheme from the options database

Selected reports: This is the list of available reports. Reports which are possible to print can be selected for printing by clicking on the check box in front of the list. Reports which cannot be generated from the data are disabled.

Report list: This is the list of selected reports. To pre-view a graphic report click on the name in the list. To see the list of available reports click on the graphic (an example is shown below)

Select first report: Clears the list of selected reports and selects only the first report in the list

Select all reports: Selects all possible reports in the list

File option: If you have opened more than one file, you can choose whether you print the reports for all of the files or only for the active test sample data file (see open files)

Diagram: Allows the setting of diagram options, if a graphical report has been clicked in the report list of selected reports

Options: Allows the setting of other options for the selected report

Printer setup: Allows to configure the printer and page layout

Cancel: Cancels any selection and terminates

Preview: If checked the reports are printed on the virtual printer

Print: Terminates this window and continues
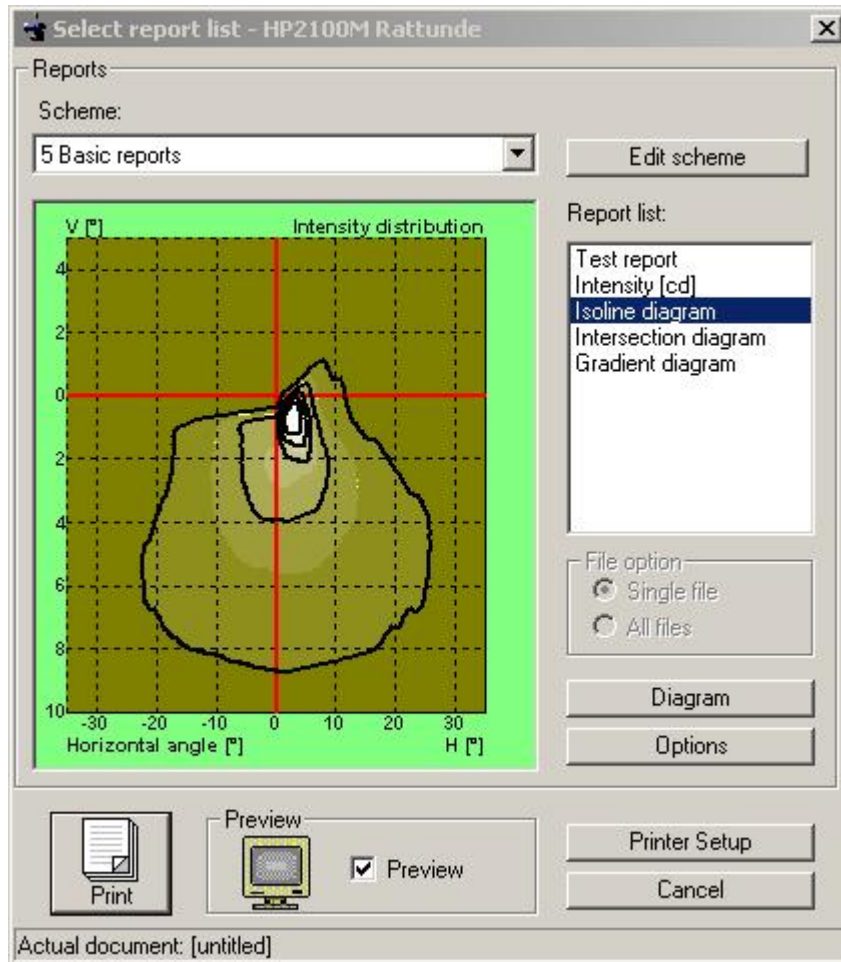
The graphic appears if the data contain a light distribution, Isoline diagram has been selected from the available report list, and Isoline diagram has been clicked on in the report list at the right side of the window. To return to normal view click on the area of the graphic.

Show pictures

Virtual printer

The virtual printer is shown when you print a report with the pre-view option enabled.

This window can be re-sized

Printer: Click on portrait or landscape icon to change the size of the page on the screen

Page name on top of the window: Select a page by this pull down list (if any)

Vertical bar (right most side): Move this bar with the mouse to select other pages (if any)

Select page: Select a page by the number (if any)

Scaling: Move the slider to left to decrease, to the right to increase the size of the page

Show page: Show full page in the window

Copies: Change this value if you want to print more copies

Load doc: You can save documents (one or multiple pages) as document files (extensions .lmp). These compressed files can only be used from later loading back into the virtual printer, then sending them to the Windows printer

Save doc: You can save documents (one or multiple pages) as document files (extensions .lmp)

Clear doc: Deletes all pages in the document and terminates

Print page: Print the actual page to the printer and terminates

Print selected: You can select pages from the document which you want to print. The pages are printed and the virtual printer terminates (see below)

Print all: Print all pages and terminates

Cancel: Cancels and terminates

OK: Terminates the virtual printer

Note:

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If you print one, several, or all pages, you cannot add more pages to the document. Next printing to the virtual printer will automatically clear all pages.

Select pages of the document
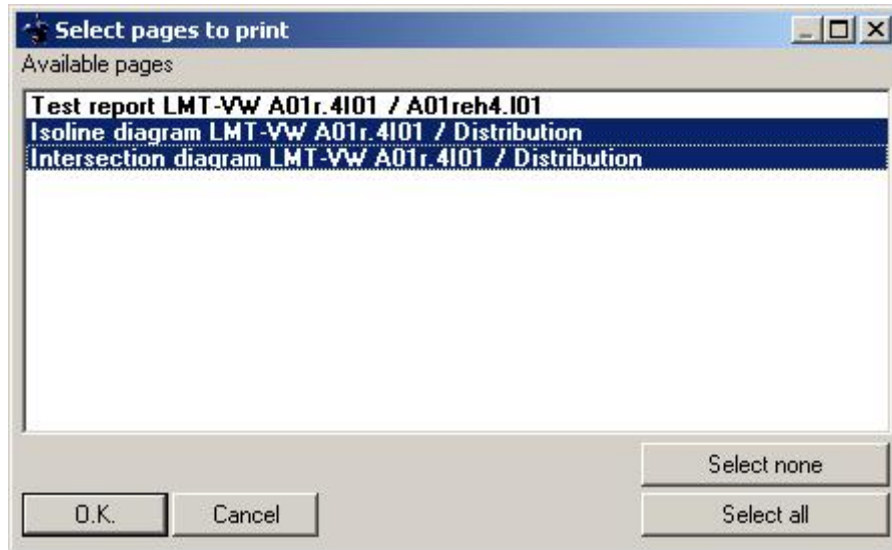
Select: Click on each entry to make a selection (use Shift and Ctrl keys for multiple selection)

Select none: Clears all selections

Select all: Selects all pages

OK: Terminates the selection and prints the selected pages

Cancel: Terminates the selection and does not print the selected pages

Simulation

Show pictures

This item can be selected from the Limes main evaluation menu

The purpose of this function is to display bitmap files (photographs, diagrams, etc.) in any compatible graphical format in a sort of a slide show in either window or full screen view.

Pictures can be presented in a given order, changing the picture can be either on key pressing or automatically after a specified period.

New project

This item can be selected from the Limes main simulation menu. It allows you to clear any parameters or results of an opened road lighting calculation project.

Isoroad Assistent

Isoroad Assistent

The Isoroad Assistent helps you to create an project to calculate the illuminance or intensity distribution on a road illuminated by automotive headlamps or other lamps installed into a vehicle standing on the road.

The Isoroad Assistant guides you step by step through the creation of the project. Once you are familiar with the project concept, you can also go immediately to the short form style, where you can manipulate the specifics of a project directly where you want.

With an assistant you can move forward and backward through the creation process of an isoroad lighting project. When you are finished with one step, you can either go forward to the next step by clicking on the forward button or go back by clicking on the back button.

When you cancel the assistant, your data are still available at the next time you start the assistant, but not after terminating the Limes program. To save a project you have to go to the last step on which you can save everything under a certain project name into a file with a special ASCII format.

More information about road lighting calculation see in Basic Concept

Isoroad Assistant: Start window

Use short form: Use the short form editor instead of the assistant

Do not show this assistant in the future: Use short form every time you create a project. You can go back to the assistant tool by enabling it in the Limes options program menu.

Options

Start options

Start options

This item is a submenu item of the Limes options menu.

The Start options menu contains all submenus to access all settings used by the Limes and LimesControl programs.

When the submenu Start options is selected, the used can select the individual options menus from a window as shown below. To do a selection move the mouse cursor to a certain field. The field text changes its style to a bold font. Click the left mouse button invokes the selected option.
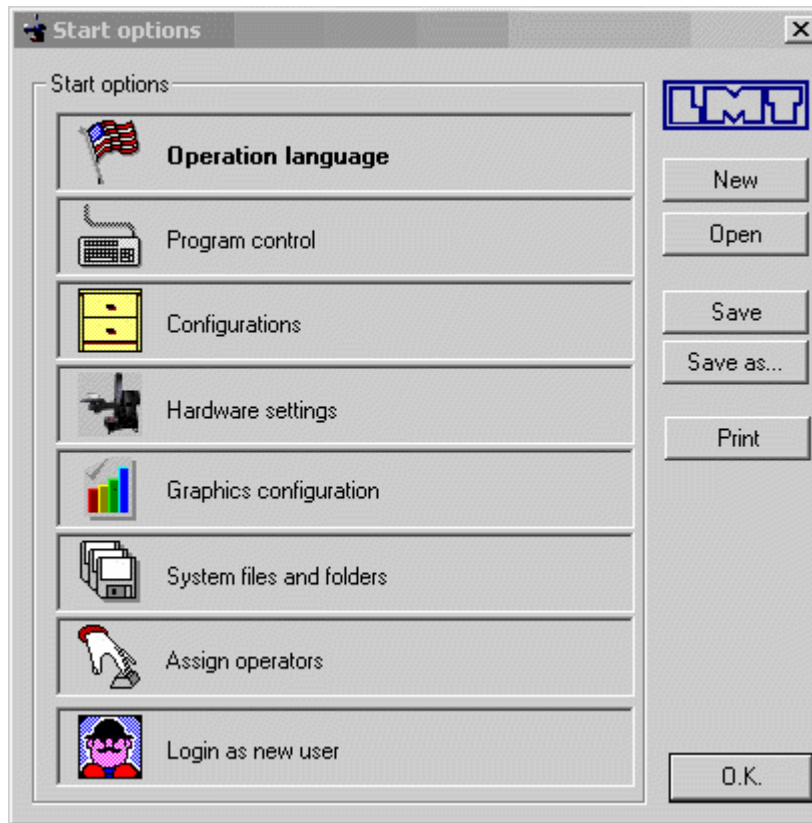
The buttons on the right side concern mainly the hardware settings.

New: A new hardware configuration file (extension .ini) can be created

Open: A different hardware configuration file (extension .ini) can be opened

Save: The hardware configuration is saved into the actual configuration file

Save as: The hardware configuration is saved into a new configuration file

Print: Prints a configuration report (.ini file content)

O.K.: continue with the Limes program

Other selections

Language

Program

Hardware

- Graphic
- Folders
- Configurations
- Operators
- User login

Language

The operation language can be selected from the Limes main menu item Options.
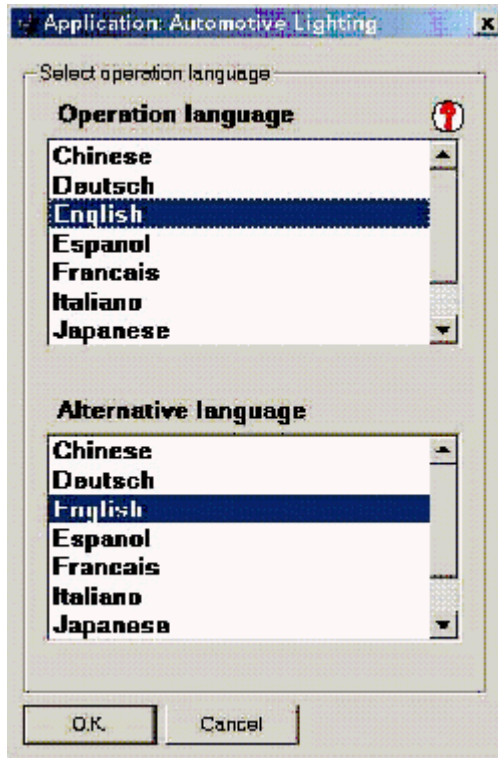
To select a language, click on to the corresponding language name in the list fields.

To find out how much items have been translated in a language, click to the question mark. A percentage number is displayed after a while behind the language name, indicating the amount of translated items.

Operation language

The list shows all available languages in the Limes items database (default items.mdb in the Limes 2000\Data folder.

The operation language defines the language in which any text shown in a program window is displayed. The operation language is initially used as well for all printed text.

If an item is not available in this language in the items database, because it has not yet been translated into this language, the text is shown in the Alternative language as selected on the next list field.

Alternative language

The list shows all available languages in the Limes items database (default items.mdb in the Limes 2000\Data folder.

If an item is not available in the selected operation language in the items database, because it has not yet been translated into this language, the text is shown in this language.

If the item is not available in the Alternative language, it is displayed in the Limes reference language (LMT defined English).

> *Note:*
> *By clicking on a language name of the Operation language field, all text displayed in this window is immediately changed into the selected language.*

O.K.: The selection is applied to the program. This may take a while since all visible windows of the Limes program are changed into the new language.

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Cancel: The selection is canceled and the original languages are used.

Operators

The operators assignment window is a part of the Start options window.

In this window any user logged in as a 'master' can define new or change the properties of existing operators.
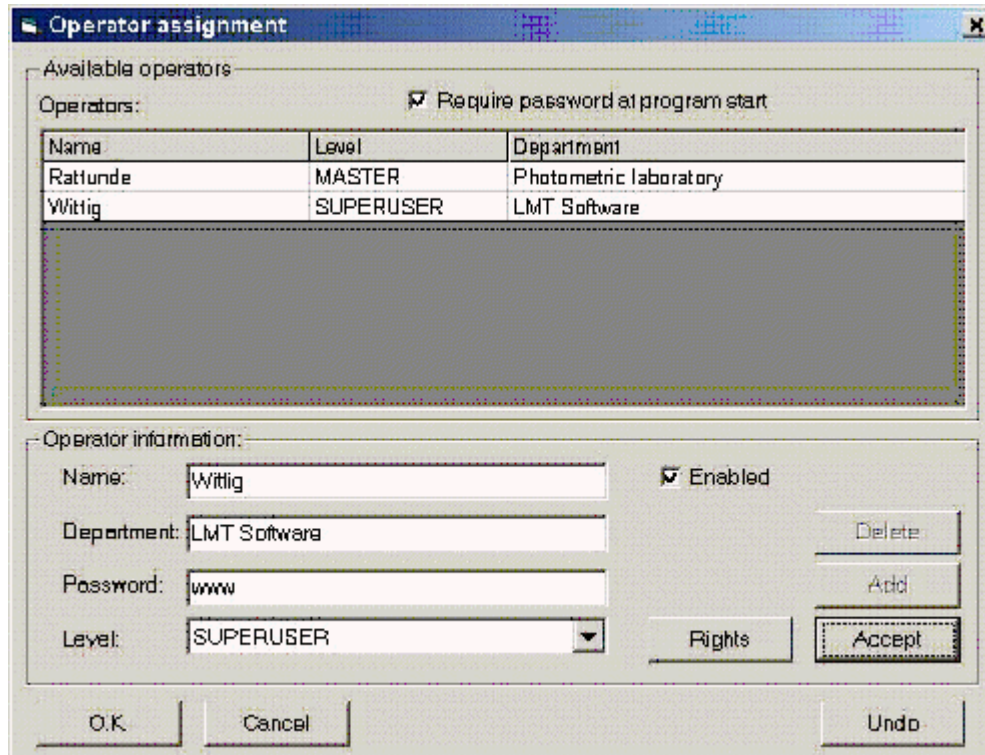
Require password at program start: If checked, the Limes program requires a login any time it is started. If not, the last user is automatically logged in.

Available operators: A list of the available operators is displayed. To get specific information or modify the setting for an operator, click on the name in the list.

Operator name: Any name to specify an operator.

> *Note:*
> *The operators name is used automatically to identify the user on a test report and is saved with the test sample data within the database.*

Department: A description for the department (any text or blank)

Password: Here the operators password appear in clear text

Level: The user level of the operator (master, super user, user)

Enabled: If checked the operator can login, if not he is not able to use the program

Delete: Delete an operator from the list. If you want to delete him only for a limited time, use the enable check box instead.

Accept: Accepts all modifications in the data edited for an operator.

Add: The data is saved as a new operator

Undo: All modifications made are thrown away

O.K..: saves all operators into the user database

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Cancel: Terminates this window without saving.

User Rights

If the user has been given the user level SUPERUSER, individual rights can be enabled for the operation of the LIMES software.

Click on the Rights button to access the user rights window.
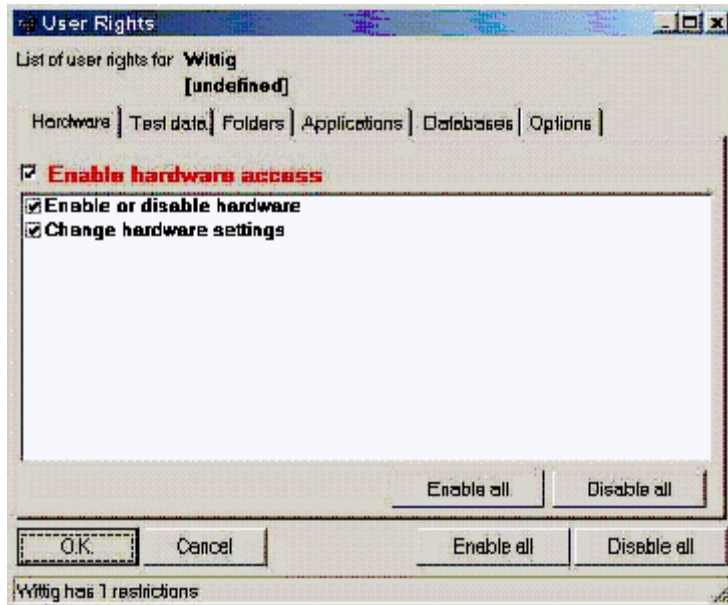
O.K.: Accept and continue

Cancel: Throw away any changes

Enable all: Enable all user rights of all sections

Disable all: Disable all user rights of all sections

User rights: Hardware

This section is used to enable or disable user rights concerning the hardware settings.
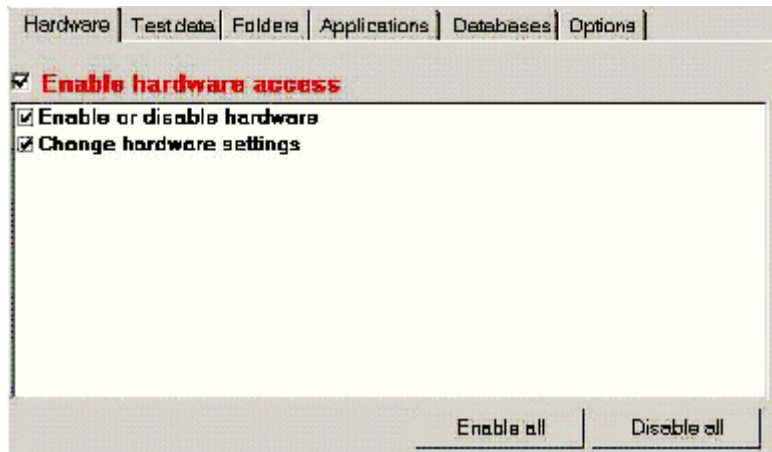
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User rights: Test data

This section is used to enable or disable user rights concerning the test data handling.
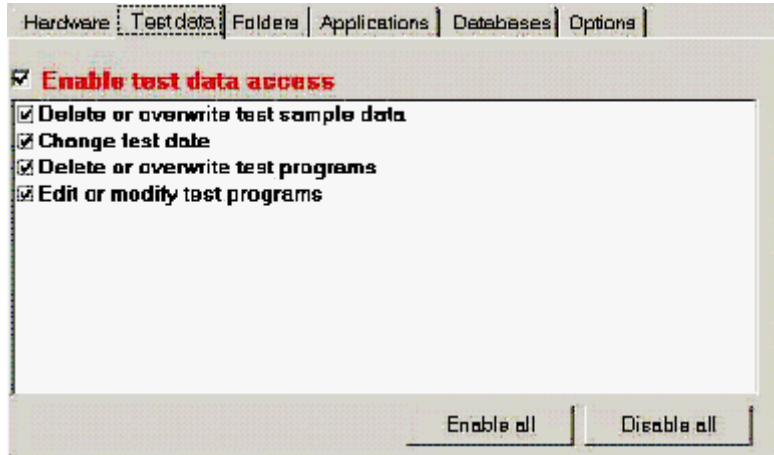
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User rights: Folders

This section is used to enable or disable user rights concerning the Selection or modification of default files and folders.
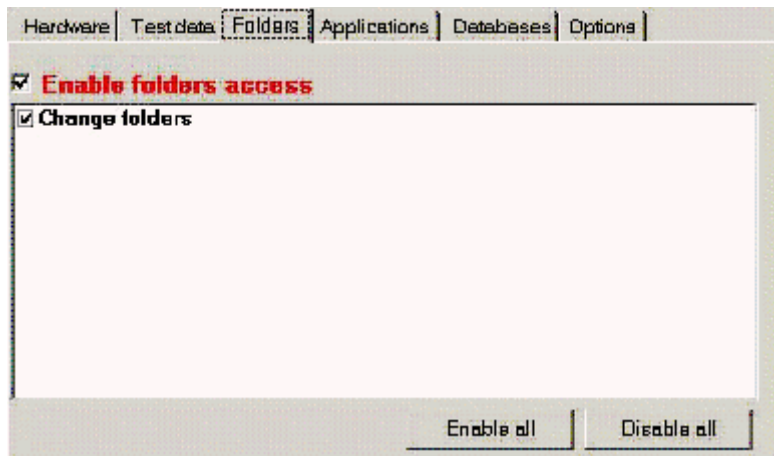
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User rights: Applications

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This section is used to enable or disable user rights concerning the manipulation of applications.
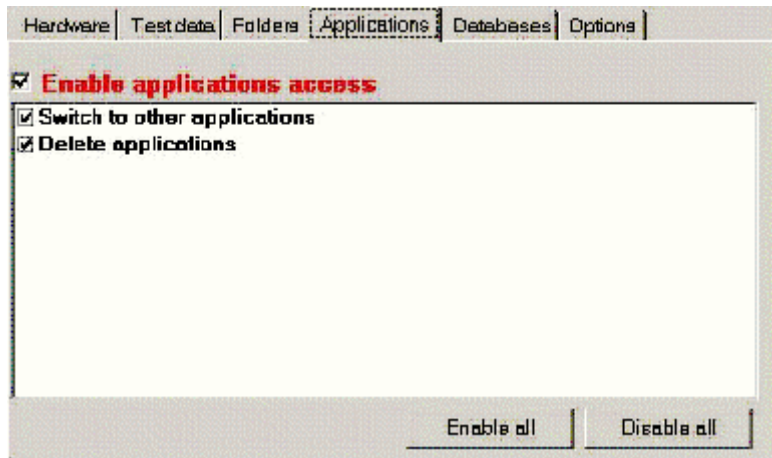
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User rights: Databases

This section is used to enable or disable user rights concerning the access to databases.
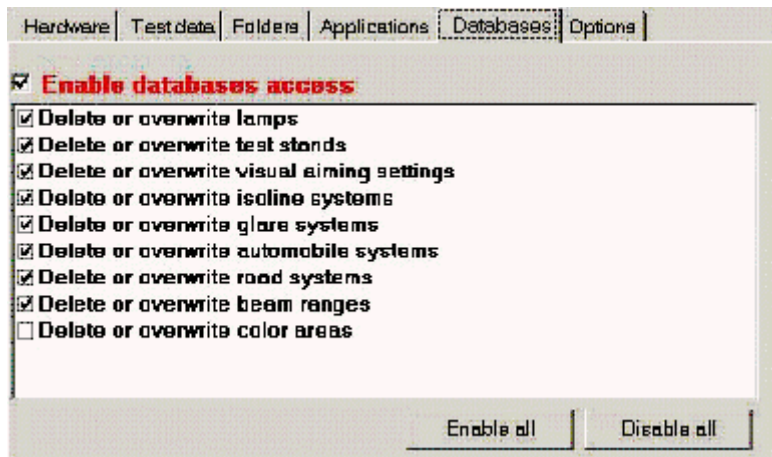
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User rights: Options

This section is used to enable or disable user rights concerning the treatment of several other options.
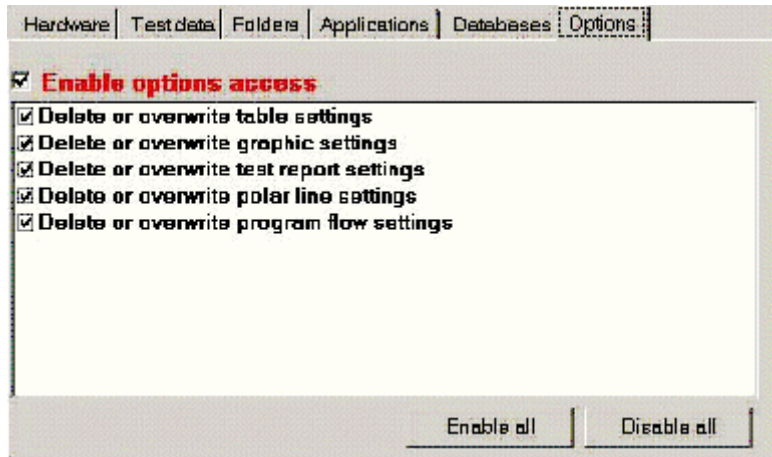
Enable all: Enable all user rights of this section

Disable all: Disable all user rights of this section

User login

When LMT LIMES 2000 is started for the first time, or when the option 'login at program start' has been enabled in the Operators assignment window, the user login window appears.

The user login window is also a part of the Start options window.
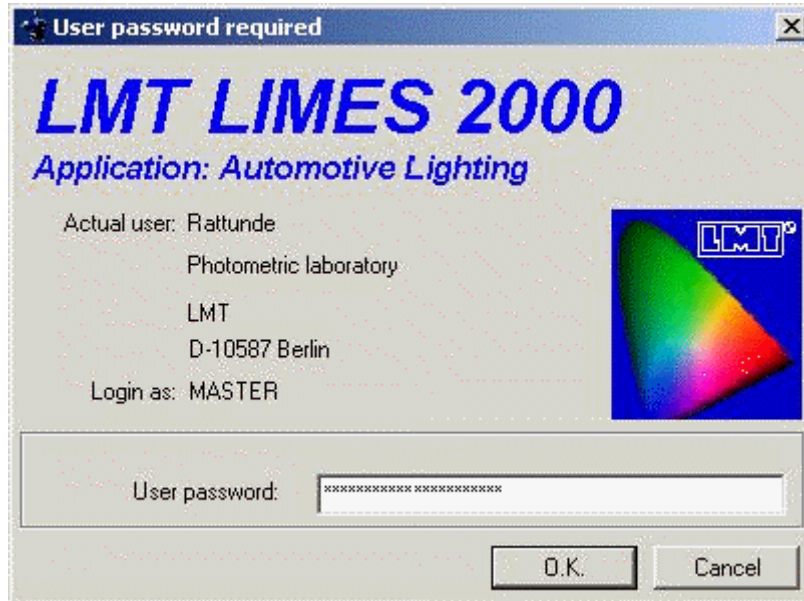
The user has to type a valid password to allow the operation of this program. The password does not appear in clear text, each key is replayed by an asterix (*).

After clicking O.K or hitting the Enter key, the program checks whether this password belong to a valid user.

> *Note:*
> *Clicking on the Cancel button without login gives you a message. This informs you that the LIMES program may terminate if you do not login properly. Canceling this message automatically terminates the LMT LIMES 2000 program!*

If the password is the general user password, the program allows to enter or change the user name and company or enter or modify the general password.
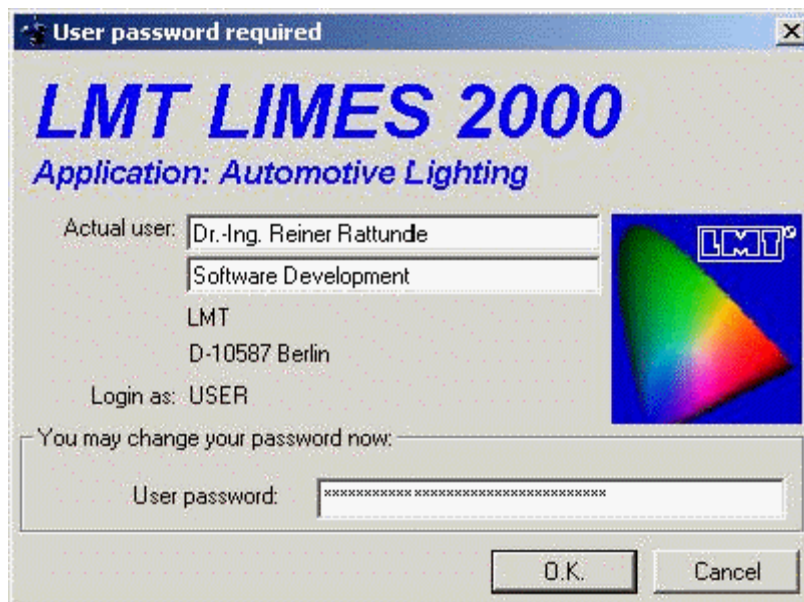
The password (whether changed or not) has to be confirmed by typing it again:

If the entered text is not identical to the original, the user has to start to login again. If the text is identical, a message displays the success of login. This message is also displayed if any other valid user (operator) password has been entered.
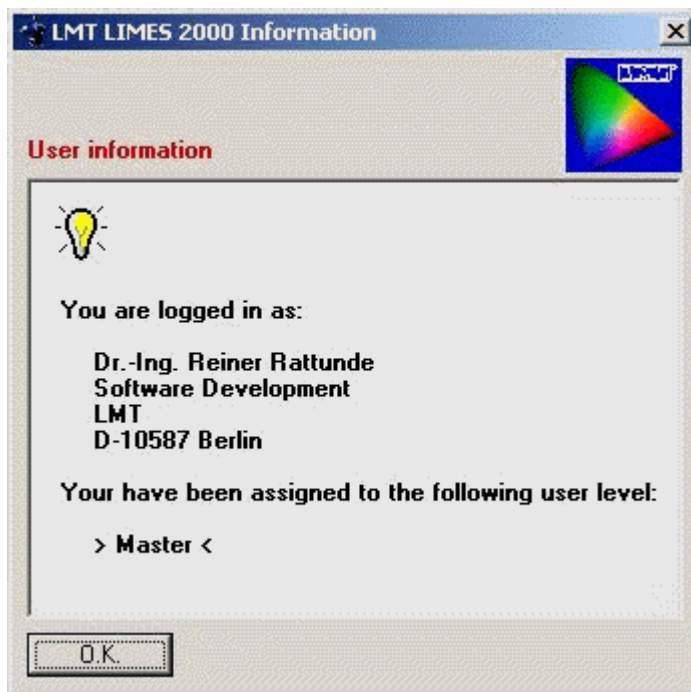
After clicking O.K of hitting the Enter key the login is finished

> *Note:*
> *The general password can nowhere be found and is nowhere displayed in the Limes program. The general user has the full responsibility to remember his password for future access to this window.*

Edit hardware settings file

The hardware settings file (default Limes.ini) contains information about the settings of the properties of the connected hardware, like goniophotometers, photometric measurement devices, or electrical measurement or supply instruments. The manipulation of the .ini-file is available in the LIMES program only for users logged in as Masters.

In an .ini file items are grouped under a certain header, displayed in brackets (e.g. [GO-DS 2000]).

Such an .ini-file can be edited with any Windows text editor, like Notepad, but also with this function of the Limes program.
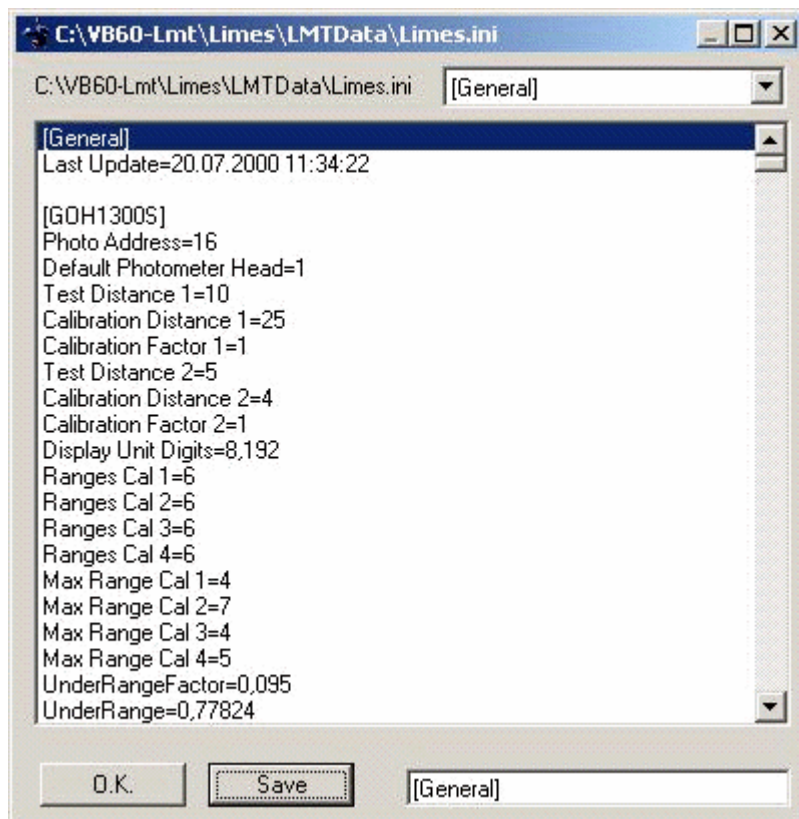
The **pull down list** allows the display of the selected header in the .ini-file

Click on a line in the list to pure-select an item.

The **text field** on the bottom allows you to modify the selected items

Use the **Insert** and **Delete** keys on the keyboard to modify the list

O.K.: Terminates without saving

Save: Saves the modifications and terminates

> *Note:*
> *Modifications in the .ini-file are made after changing any hardware options in the Limes program. The editing of the .ini-file directly should only be done by experienced users, as improper entries in the .ini-file can cause system crashes or at least unwanted behavior of instruments under Limes program control.*

Program options

Program options

The program options define all settings used for the execution of the LMT LIMES 2000 software.
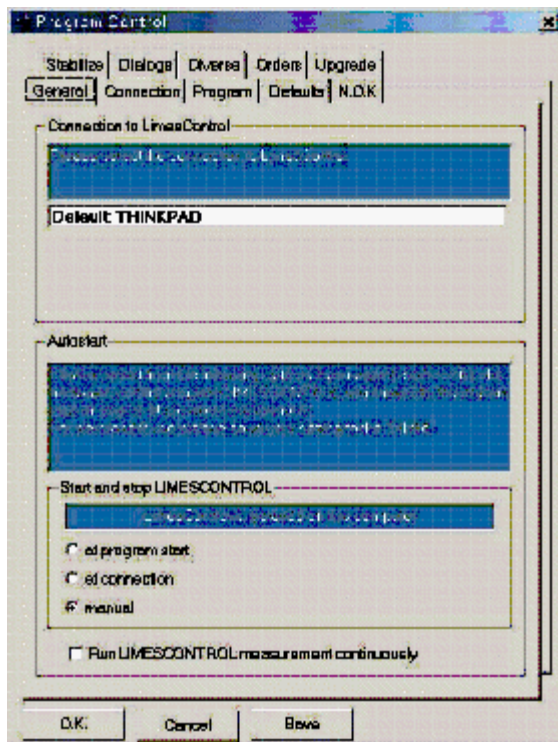
To get to another page of the program window, click on one of the tabs on top of this window.

O.K.: Accept any modification made in this window and continue with the Limes program. Any changes are saved automatically when the Limes program terminates.

Cancel: All modifications are canceled.

Save: Modifications are saved immediately to the Windows registry.

General

Connection

Program

Defaults

N.O.K (not ok marking)

Stabilize

Dialogs

Diverse

Orders

Upgrade

Program options: General

The general options define how the hardware control program LimesControl.exe is started.
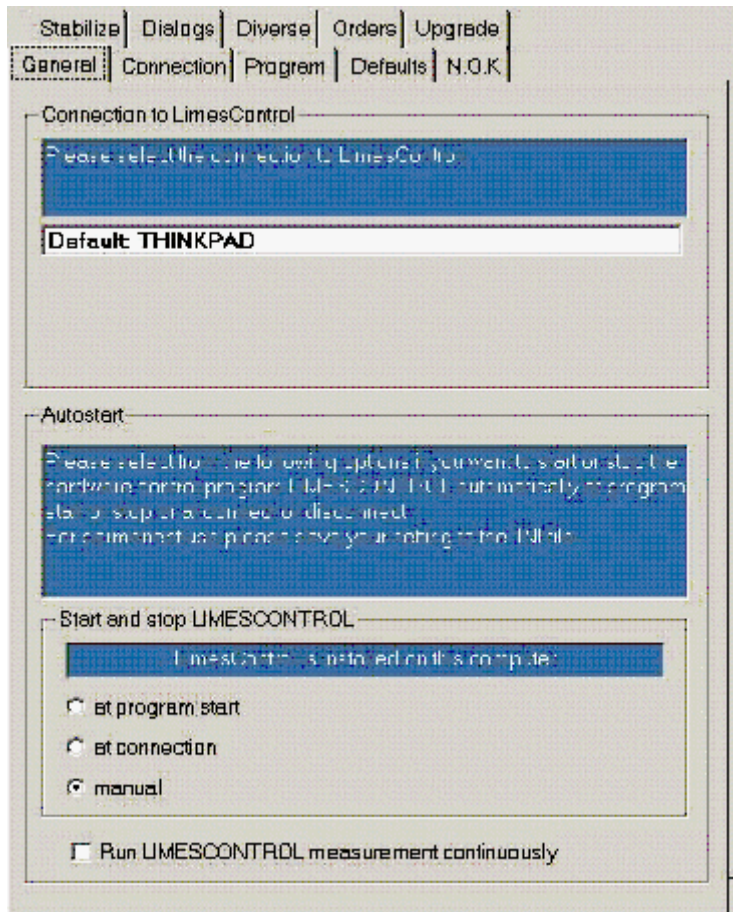
Connection to LimesControl:

A connection defined with its parameters in the Connection section of this window can be saved with a name into the Windows registry. The list shows all available connection definitions A pre-defined connection can be selected by clicking onto a connection name in this list.

> *Note:*
> *This function of the LMT LIMES 2000 software is used, if different LimesControl programs are used on different computers in the network, which control different hardware.*
>
> *Example: The user has two different goniophotometers. Each goniophotometer is connected to a control PC which runs a LimesControl program. With a pre-defined connection the Limes program can be easily switched from controlling either the one or the other goniophotometer.*

Start and stop LimesControl

At program start: LimesControl program starts automatically after the Limes program has been started, initialized and the user has logged in.

At connection: LimesControl program starts automatically if the Limes program tries to establish a connection to the LimesControl program

Manual: The LimesControl program has to be started by the user manually by either selecting LimesControl from the Windows start menu or using a shortcut or icon on the desktop.

Note:
LimesControl program must be started manually if it is installed on a different computer.

Note:
More information about the network concept can be found in the general section of the LMT LIMES 2000 operation manual

Network concept

Program options: Connection

The connection window is a part of the program options window.

The connection window allows the setting of the connection parameters between the Limes and LimesControl program.
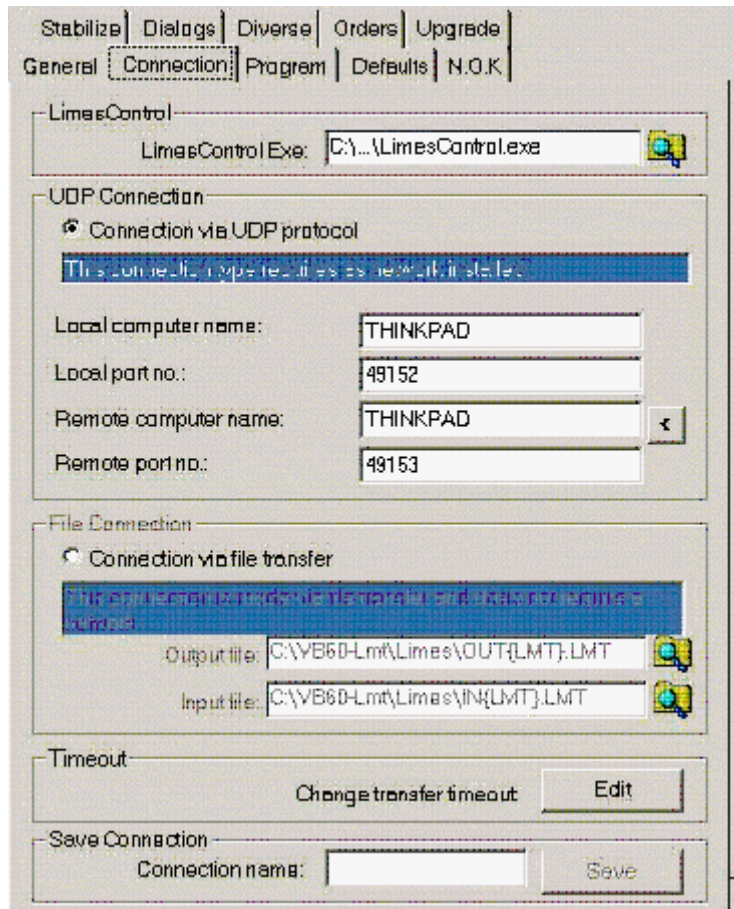
LimesControl: The full path of the LMT LimesControl executable program LimesControl.exe

Connection via UDP protocol: Click here to select the default connection type (recommended)

Connection via file transfer: Click here to select the secondary connection type

Local computer name: Automatically inserted by LIMES

Local port name: default to 49152

Remote computer name: Automatically inserted by LIMES if clicked on the arrow button besides the name

Remote port name: default to 49153

Output file: The full path of the output file. The output file is a temporary file created when Limes sends requests to the LimesControl program

Input file: The full path of the input file. The input file is a temporary file created when LimesControl sends requested information (measurement data) to the Limes program

> *Note:*
> *The user must have rights to write to and read from the selected folder*

Timeout: The maximum time which Limes waits until it receives the requested data from LimesControl. Can be modified with the Edit button

Save connection: A connection setting can be saved with a certain name into the Windows registry. Any text up to 256 characters can be used as a name

Program options: Connections settings

This window can be accessed from the options menu Program connections.

The timeout values (the maximum time which Limes waits until it receives the requested data from LimesControl) can be set.

When the time limit is reached, and LimesControl did not response, a message is displayed.

The use of the different times is solely controlled by the Limes program and cannot be changed by the user.
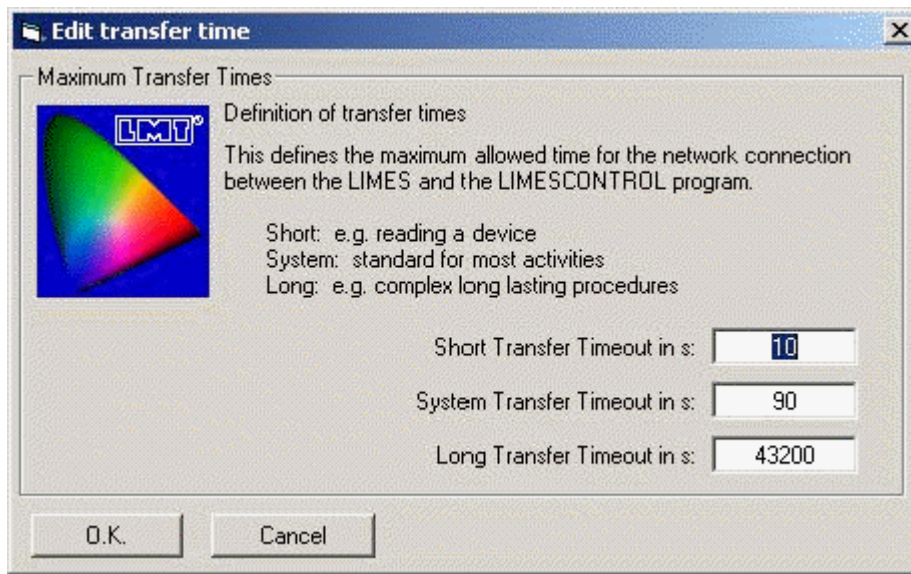
Short transfer timeout: Time limit for usually fast response from LimesControl, e.g. after reading a single measurement device, given in seconds

System transfer timeout: Time limit for usually normal response from LimesControl, e.g. after moving a goniometer into a certain angular position, given in seconds

Long transfer timeout: Time limit for usually slow response from LimesControl, e.g. after measurement of a complex function such as a complete intensity distribution with a goniophotometer, given in seconds

O.K.: Accept the data and return to the Program window.

Cancel: Throw away new settings

Program options: Program

The program window is a part of the program options window.

The program window allows the setting of general conditions for graphical manipulations during the graphical data evaluation.
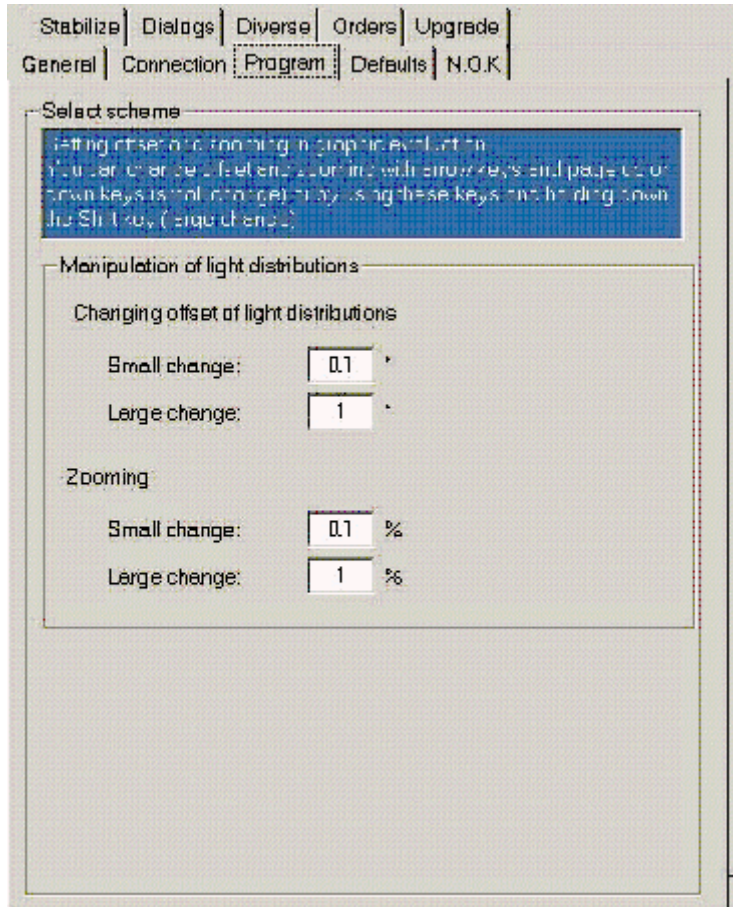
Changing offset of light distributions

Small change: Enter the angular changing of offset values if the arrow up or down keys are pressed

Large change: Enter the angular changing of offset values if the page up or down keys are pressed

Zooming

Small change: Enter the angular changing for zooming if the arrow up or down keys are pressed

Large change: Enter the angular changing for zooming if the page up or down keys are pressed

Program options: Defaults

The defaults window is a part of the program options window.

The defaults window allows the editing and selection of several default settings used in the Limes program.
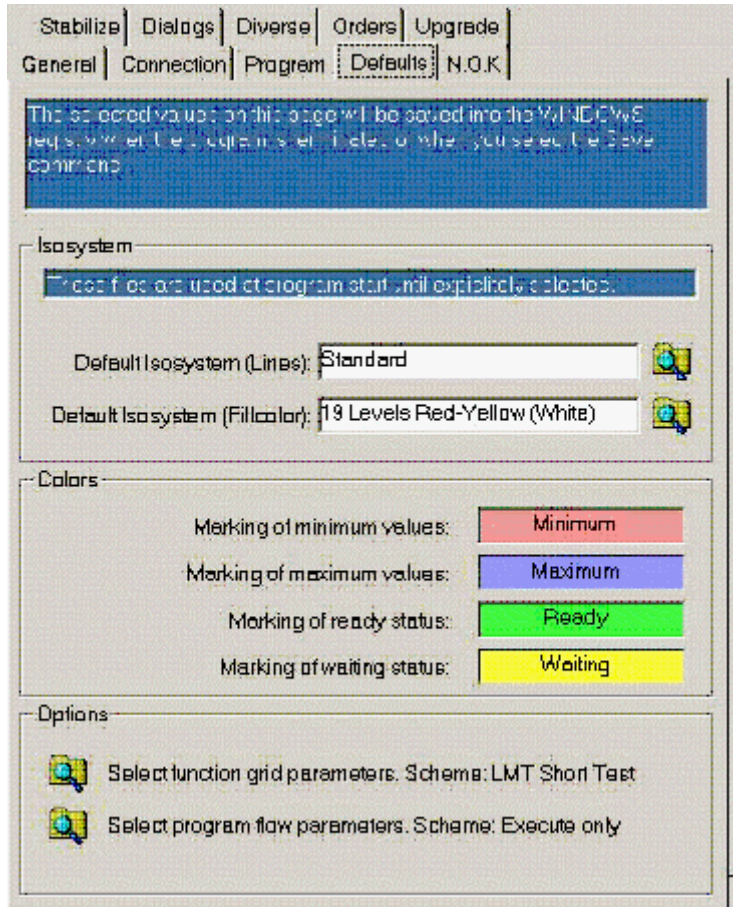
Iso-system: Default iso-systems used if no specific systems are specified during evaluation

Lines: Default iso-system to plot iso-lines (lines of constant illuminance or intensity in an isolux or isocandela diagram)

Fillcolor: Default iso-system to fill areas (areas of a certain level of illuminance or intensities in an isolux or isocandela diagram)

> *Note:*
> *More information about iso-systems can be found in the general section of the LMT LIMES 2000 operation manual*

▢ Iso-systems

▢ Edit iso-values

Colors: Define the color used during program execution or evauation to mark minimum or maximum values or status of measurement.

Ready: A function is ready for measurement during program execution

Waiting: A function is waiting for measurement during program execution

Options grid: Select default values for the size of grids (tables) of protocols. Click on the Select button to display the grid editor window

Options Program flow: Select the default program flow

Program options: N.O.K.

The N.O.K. window is a part of the program options window.

The N.O.K. window allows the editing and selection of default settings for the N.O.K. (not O.K.) marking of values in a test report.

> *Note:*
> *If in a test program a minimum or maximum requirement has been defined, the Limes program checks whether the measured photometric values exceeds these values. If this is the case, the value can be marked as N.O.K (not O.K.) in the test protocol to indicate the test sample did not pass the test.*

N.O.K. marking can be made by displaying a selected character or word behind the measured value, and a different background color can be applied to the field where this mark is printed.

Show N.O.K. mark on reports: If checked the selected N.O.K. marks are used and displayed or printed.

Value is …: These fields allow to enter the N.O.K. marking text

Font: Select the character style (font) for the printing of the N.O.K. marks

Color: Select the background color

Program options: Stabilize

The stabilize window is a part of the program options window.

The stabilize window allows the editing and selection of default settings for the stabilization of lamps (burning in before test) if not other values have been specified in the [lamp database](#)

Lamp_database
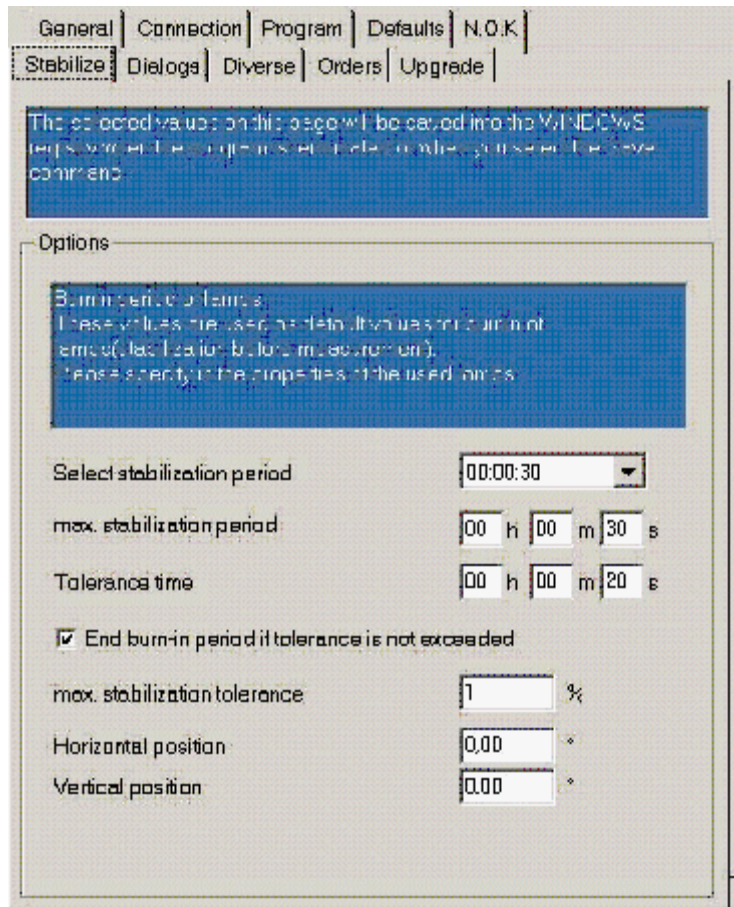
Stabilization period:. The maximum time allowed for stabilization of lamps. Can be selected from a pre-defined list or entered in terms of hours (h), minutes (m) and seconds (s).

Tolerance time: The time period for which the deviation of photometric value is checked.

End burn-in period: Terminate stabilization before maximum time expired if the lamp is stable.

Max stabilization tolerance: The stabilization tolerance in percent of the initial reading

Horizontal position: The horizontal angle if the lamp is tested in a goniophotometer at which the stabilization of the photometric values are measured

Vertical position: The vertical angle if the lamp is tested in a goniophotometer at which the stabilization of the photometric values are measured

> *Note:*
> *More information about the lamp stabilization concept can be found in the general section of the LMT LIMES 2000 operation manual*

Lamp stabilization concept

Program options: Dialogs

The dialogs window is a part of the program options window.

The dialogs window allows to enable or disable the appearance of standard dialogs, which require an interaction of the user by clicking on a button until the program continues.
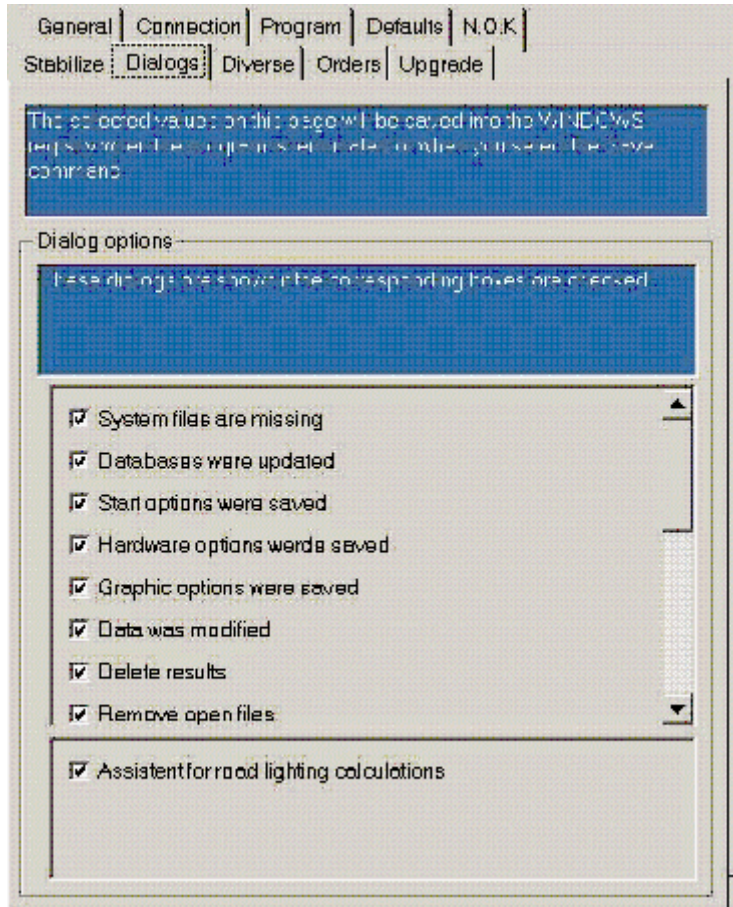
The dialogs are enabled (they appear in the corresponding action) if the check box in front of the dialog description is checked, other wise they don't appear.

To see more dialogs than visible in the window move the bar at the right hand side of the window with the mouse.

Example:

After modification of hardware settings the user selects to save the modifications to the configuration file. After the saving is done, the Limes program displays a message to tell the user that this action was performed properly.
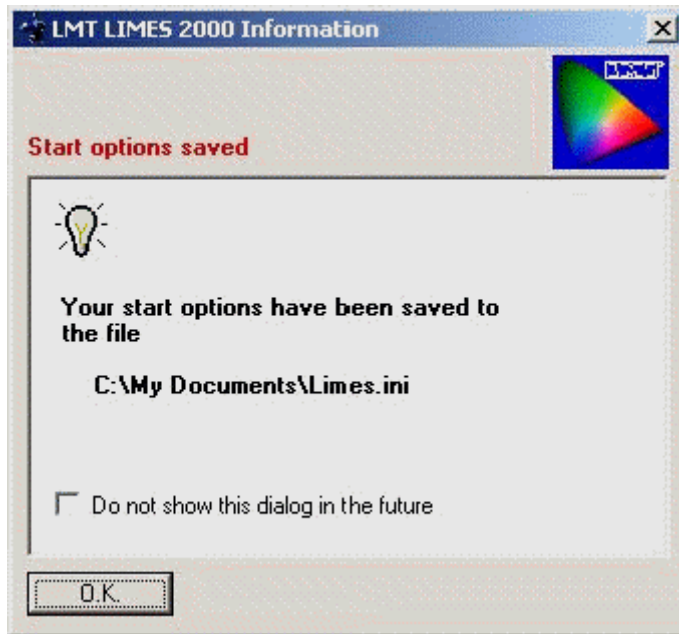
The user has to click the O.K. button to continue the program.

Do not show this dialog in the future

If the user clicks on the check box, this dialog does not appear any more, when the hardware setting are changed.

The item 'Hardware options were saved' in the list of dialogs appears unchecked when the user goes into this program options window the next time.

> *Note:*
> *If you are not sure whether a dialog should appear or not, or what the meaning of a certain dialog in the list of dialogs is, or you do not know when it will appear, enable it by clicking on the check box so that it is filled with the black mark*

Program options: Diverse

The diverse window is a part of the program options window.

The diverse window allows the setting of various auxiliary function during program execution. From this window also the list of last opened files or programs can be influenced.
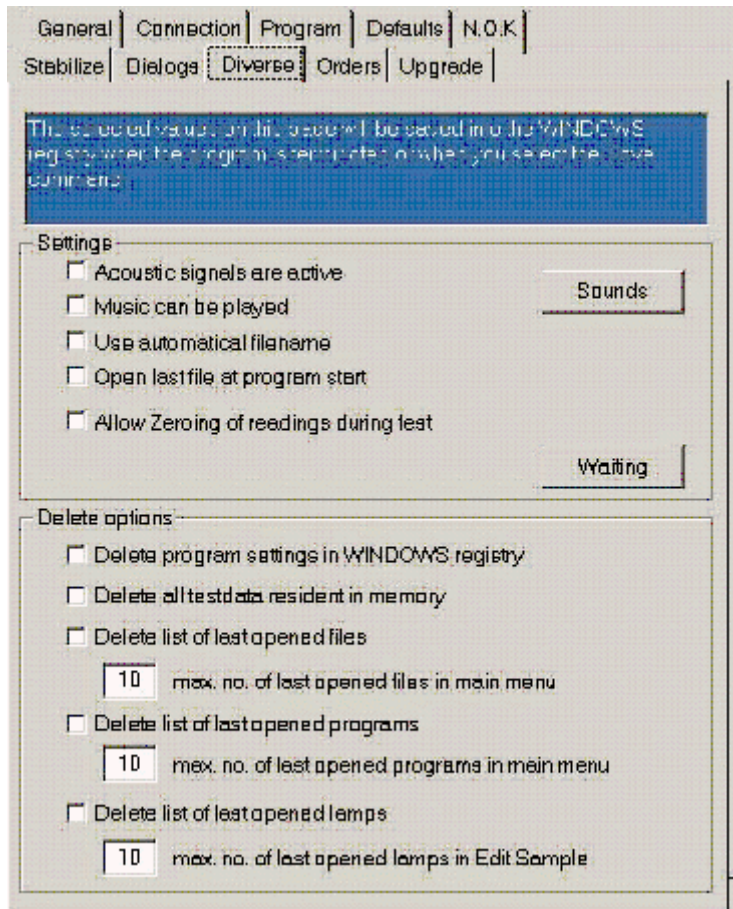
Acoustic signals are active: Defines whether the selected acoustic signals are played via the computers sound card and connected sound system at their pre-defined situations.

Music can be played: Defines whether the selected music files are played via the computers sound card and connected sound system at their pre-defined situations.

Sounds: Click on this buttons to invoke the sounds editor window to allow you to assign certain sounds of certain incidents

Use automatical file name: Allows the program to assign a new file name automatically. This occurs only after an automatic test, when the program flow settings require the test data to be saved after measurement in the test sample database. If (for instance on measurement repetitions) the user does not want everytime to enter a different name manually using the Edit test sample window, this option can be used. If the test sample data name exists already in the database, a new name is created by adding a figure (counter) at the end of the name.

Example:

The following file name exists:

        Special test sample

A new name is created as

        Special test sample1

And the data is saved with this name without requiring to enter the name manually

Open last file at program start: If checked the last test sample data file which was opened before the LIMES program was terminated during the last session is automatically loaded from the database

Allow Zeroing of readings during test: If checked, the so-called Zeroing procedure can be used during program execution.

Sounds: Invokes the sound list editor

Waiting: Invokes the Waiting during execution editor

Delete options: These delete options cause an immediate action when clicked.

Delete settings in Windows registry: When checked, all settings in the Windows registry for this application are deleted. When the program is started the next time, the configuration of the LMT LIMES 2000 programs has to be made as indicated in the Getting Started section of the LMT LIMES 2000 operating manual

Delete all test data resident in memory: As the Limes program can open any number of files at the same time from the test sample database and saving them in a computers memory stack, these files can be deleted if the check box is enabled.

> *Note:*
> *This function can also be performed in the Limes main menu Open test samples*

Delete list of last opened files: Deletes the list of last opened files which is attached to the Limes file menu

Delete list of last opened programs: Deletes the list of last opened test programs which is attached to the Limes program menu

Program options: Sounds

This window can be accessed if you select the LIMES main menu Options and there Program. Click on the tab Diverse and the on the button Sounds
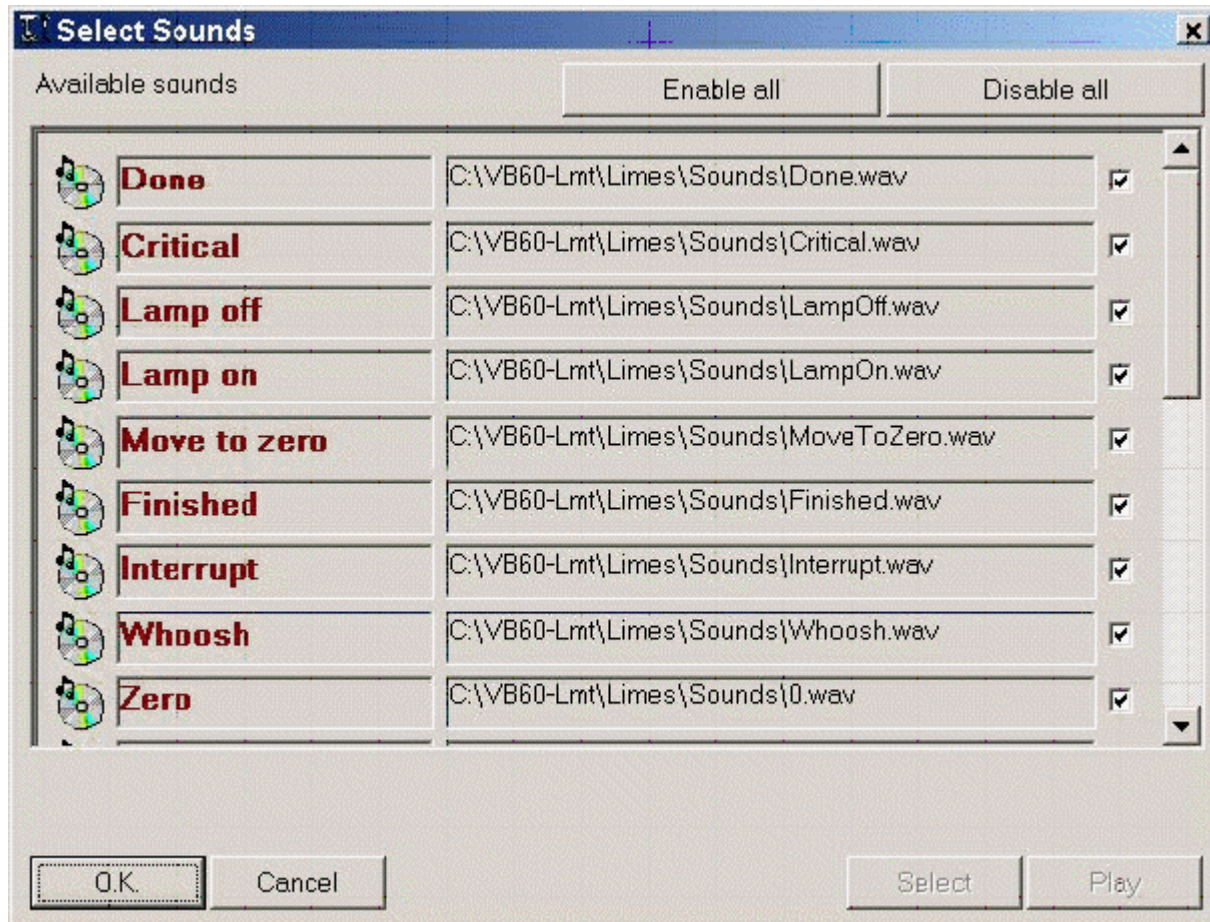
Available sounds

Sounds are acoustic messages which can be played automatically at certain incidences from the LIMES software. Sounds are named with a phrase which matches more or less the event on which they are played, like the sound "Finished" is played when a measurement is finished.

To each sound a sound file, which must be given as a so-called .wav- file, is associated. The sound files actually can contain any text phrase, of noise, or piece of music.

This sound selector allows the user to assign his own sounds to the incidences of the LIMES program.

Left column: The sound name list. Click on a name to mark it for modification or playing

Center column: The path name of the associated sound files

Right column: The checkboxes for each sound. If not marked, the sound adjacent to it is not played in the event.

Enable all: Sets all checkboxes to marked.

Disable all: Clears all checkboxes.

Select: If clicked another sound file can be selected in an explorer window and assigned to the sound

Play: If clicked the sound marked in the list is played

Note:
You can also play a sound if you click on the CD-symbol in front of the name

O.K: Accepts any modifications and save it to the Windows registry. Returns to the program options

Cancel: Throws all changes away and returns to the program options

Program options: Edit waiting

This window can be accessed if you select the LIMES main menu Options and there Program. Click on the tab Diverse and the on the button Waiting
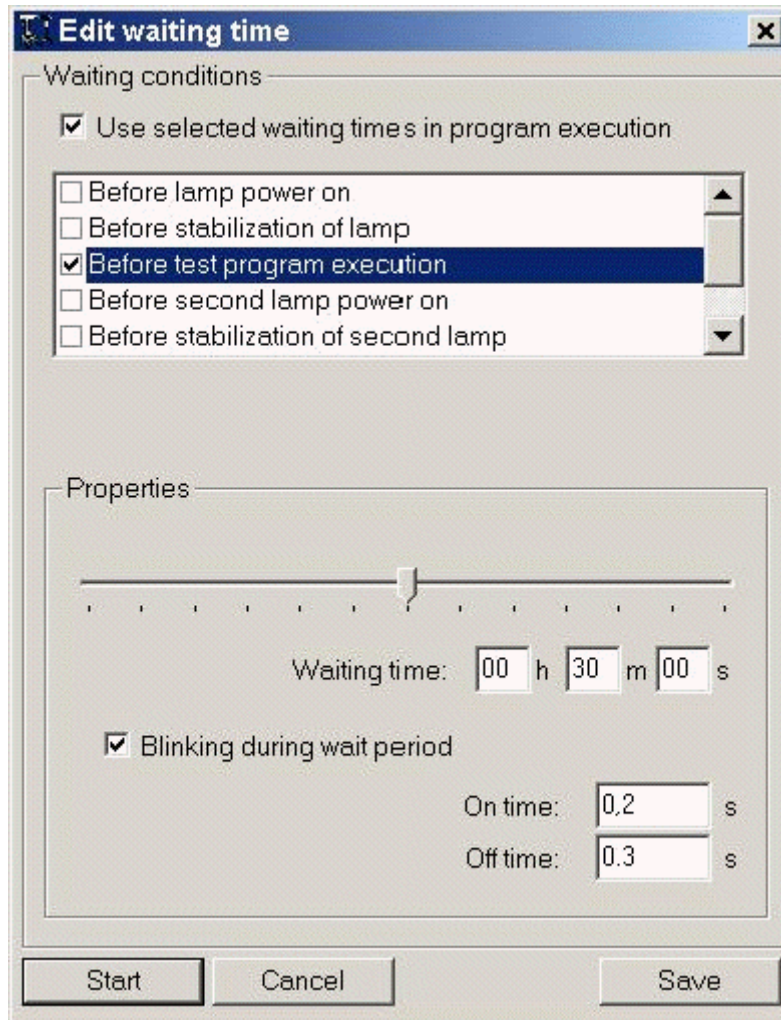
Waiting conditions

To enable the waiting procedure mark the checkbox and use selected waiting times in program executions.

To enable individual waiting mark one ore more checkboxes in front of the list of events, where waiting could be performed. The waiting procedure will be invoked during program execution before the mentioned event.

Properties

Waiting time: Enter the waiting time in hours, minutes and seconds or use the slider. Click on the slider handle, hold down the mouse button and move the slider to left or right. This will decrease or increase the waiting time from 0 to 30 min. For other time ranges use the manual input.

Blinking: If a DC-power supply is available in the system, this function can be used to simulate a blinking relay to turn the lamp on and off for intervals specified in the On time or Off time input fields.

Note:
To simulate a turn signal lamp blinking, on and off times of about 0.3 s could be used

Start: To terminate the input click on the start button.

Cancel: To throw away any modification click on the Cancel button

Save: If you want to use the setting only during the running session of the LIMES program, you do not need to save. If you want to use the settings also for future new sessions, the settings can be saved into the Windows registry

Program options: Orders

This option allows the user to re-arrange menu items and other orders.
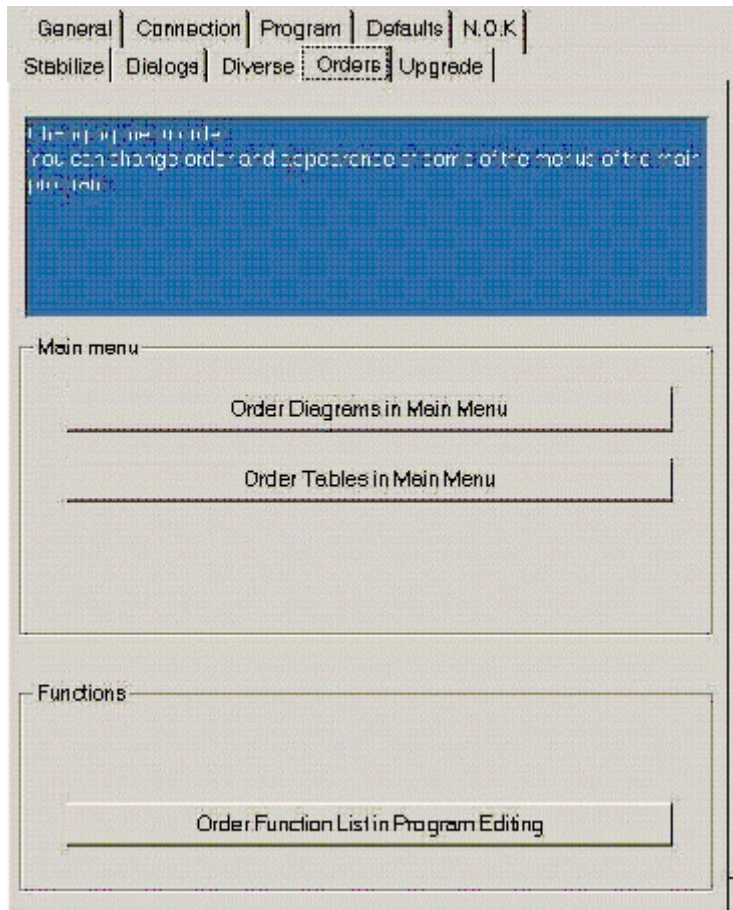
Order Diagrams: This button allows the user to change the order of the menus for graphical evaluation (part of the LIMES main menu)

Order Tables: This button allows the user to change the order of the menus for tabular evaluation (part of the LIMES main menu)

Order Function list: This button allows the user to change the order of the available test functions for editing or creation of test programs in the program function editor

Program options: Upgrade

This option allows the user to perform an upgrade of the LIMES software in case an special LIMES-Upgrade file provided by LMT is available.
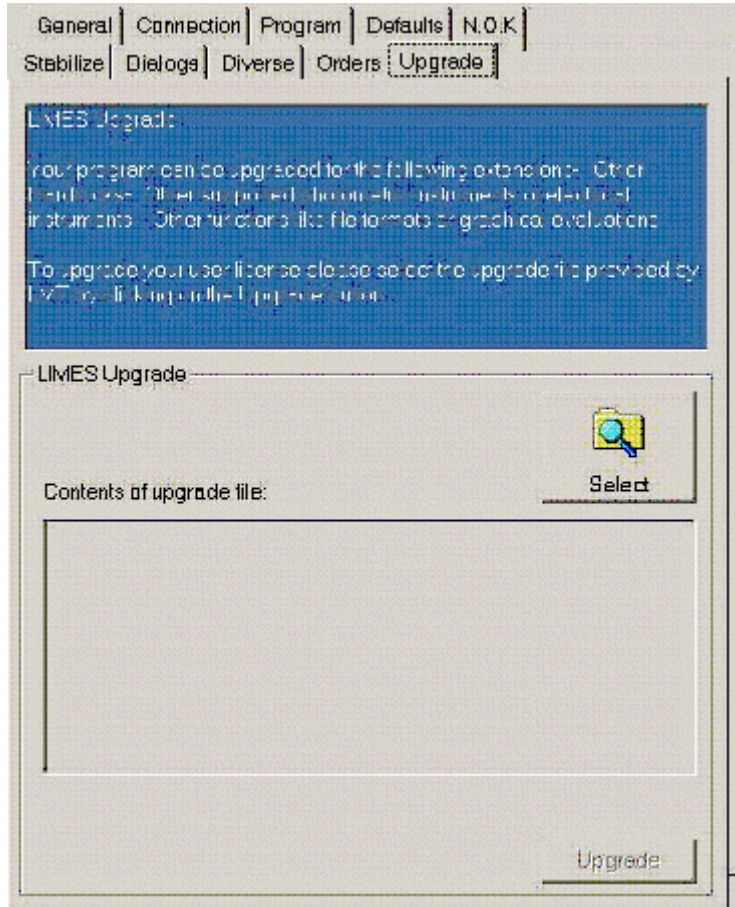
Upgrade procedure

An upgrade enhances the capabilities of the LIMES program for new possibilities, which have not been available in the original purchased version. An upgrade is necessary, if

- ❑ The user purchases software modules from LMT for measurements with new devices
- ❑ A new function is available from LMT and can be obtained free of charge

To perform an upgrade a special file (Upgrade file) must be available. This file is usually send per e-mail or on other data storage media (disk, CD) to the user and has to be copied to a location, where it can be accessed by the LIMES software.

By clicking on the select button en explorer window allows to search for the file. If a valid file is opened, the content of the upgrade is displayed in the list field. Otherwise a message appears, that the upgrade is not possible.

If a valid file has been found, you can click on the Upgrade button.

The Upgrade will usually take less then a minute. After upgrading it is strongly recommended to terminate the LIMES program and re-start. If new instruments are involved, also the LimesControl program should be terminated or at least re-initialized before use.

Configurations

Configurations

The configurations window is a part of the Start options window.

The configurations (or schemes) window allows the selection of default configurations used in the Limes program
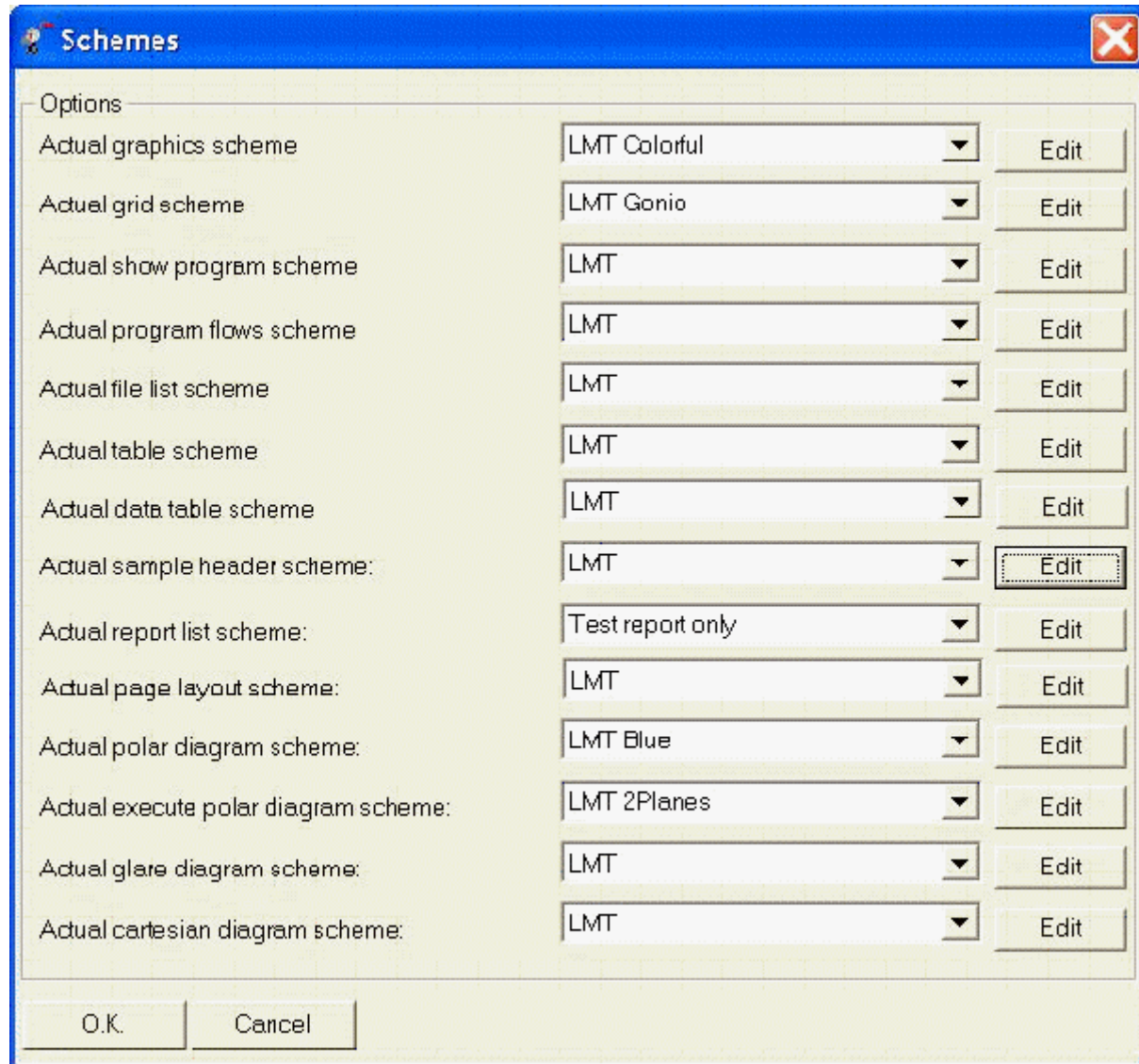
Actual graphics scheme: Allows the selection of the actual graphics scheme. Defines the layout of all graphical diagrams displayed in evaluation and anywhere else throughout the Limes program. Clicking on the Edit button displays the Graphics options window.

Actual grid scheme: Allows the selection of the actual grid scheme. Defines the layout of function tables in program execution or test reports. Clicking on the Edit button displays the Grid options window

Actual show program scheme: Allows the selection of the actual program functions graphic display scheme. Defines the style of a graphical display of test functions of a test program. Clicking on the Edit button displays the Graphical functions window

Actual program flows scheme: Allows the selection of the actual program flows scheme. Clicking on the Edit button displays the Program flow window

Actual file list scheme: Allows the selection of the actual file list scheme. Defines the style of tables for display of results of multiple files (statistics). Clicking on the Edit button displays the File list configurations window

Actual tables scheme: Allows the selection of the actual tables scheme. Defines the layout of tables for evaluation of test data. Clicking on the Edit button displays the Table layout editor.

Actual data tables scheme: Allows the selection of the actual data tables scheme. Defines the layout of data tables for evaluation of test data. Clicking on the Edit button displays the Table layout editor.

Actual sample header scheme: Allows the selection of the actual sample header scheme. Defines the layout of sample headers printed on test protocols. Clicking on the Edit button displays the Sample header select form..

Actual report list scheme: Allows the selection of the actual report list scheme. Defines lists of test reports to be printed after execution of a test program or when printing the results from the Limes main file menu. Clicking on the Edit button displays the Report list editor.

Actual page layout scheme: Allows the selection of the actual page layour scheme. Defines the layout of pages for test protocols. Clicking on the Edit button displays the Page layout editor.

Actual polar diagram scheme: Allows the selection of the actual polar diagram scheme. Defines the lines of polar diagrams (general lighting only). Clicking on the Edit button displays the Polar diagram layout editor.

Actual execute polar diagram scheme: Allows the selection of the actual polar diagram scheme. Defines the lines of polar diagram during program execution (general lighting only). Clicking on the Edit button displays the Polar diagram layout editor.

Actual glare diagram scheme: Allows the selection of the glare diagrams scheme. Defines the layout of glare diagrams (general lighting only). Clicking on the Edit button displays the Glare diagram layout editor.

Actual Cartesian diagram scheme: Allows the selection of the actual Cartesian diagram scheme. Defines the layout of cartesian diagrams (general lighting only). Clicking on the Edit button displays the Cartesian diagram layout editor.

Grids

The grid options allow the configuration of table of data like test protocols, or program functions tables. Grid options can be set in the LIMES main menu item Configurations, but also during evaluation of test data as option settings
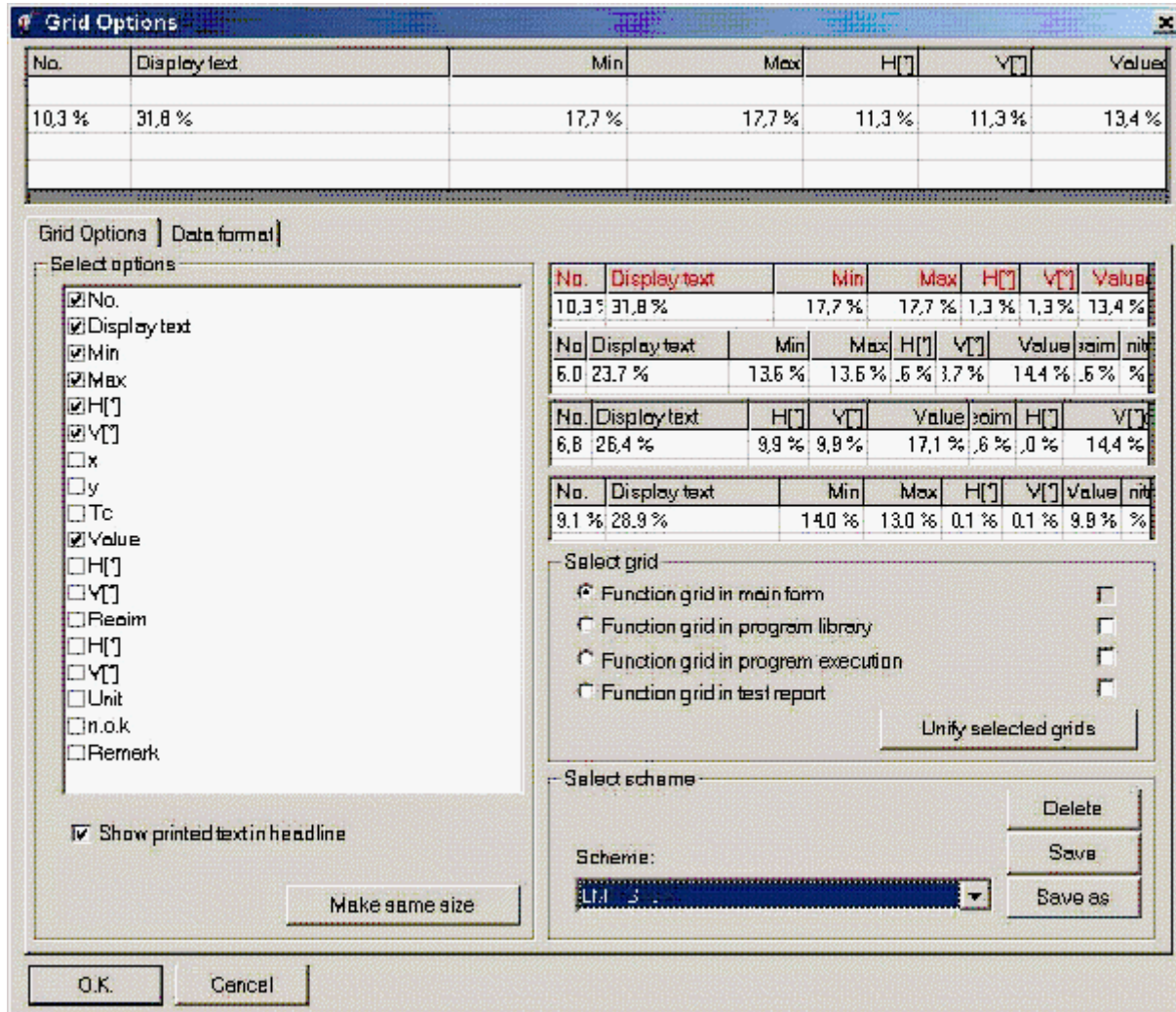
The top section shows how the configuration of a selection will look like. The headline shows the selected items, the percentages listed below are the relative widths of the columns in the table related to the table width. The table width depends on the output media, for a printed protocol it is the width of the page between the left and right margins.

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Grid options

Select options: The list shows the available items which could be shown in a table grid.

No.: The count number of the row in the table

Display text: The text displayed as the description of the program function, e. g. "HV" or "C-Planes"

Min: The text specified for a required minimum for a regulation test (automotive only)

Max: The text specified for a required maximum for a regulation test (automotive only)

H[°]: The angular coordinate for the horizontal position for this function

V[°]: The angular coordinate for the vertical position for this function

> *Note:*
> *If the function is a scan function (light distribution measurement), this column will display start, end, and step angle of the scan*

x: The chromaticity value (color location) x in the CIE color diagram (color measurement systems only)

y: The chromaticity value (color location) y in the CIE color diagram (color measurement systems only)

Tc: The correlated color temperature (color measurement systems only)

Value: The resulting value (measurement value) of the function in the defined unit

> *Note:*
> *If in a requirement test minimum or maximum are specified and the function is a scan function, this column can take the minimum and/or the maximum of the scan*

H: The horizontal location of the value (angular coordinate). This value is identical to the H[°]-value for a point measurement, but will carry the location of minimum and/or maximum for scans

V: The vertical location of the value (angular coordinate). This value is identical to the V[°]-value for a point measurement, but will carry the location of minimum and/or maximum for scans

Reaim: The reaimed value (if

any, automotive lighting only)

H: The horizontal location of the reaimed value (angular coordinate).

V: The vertical location of the reaimed value (angular coordinate).

Unit: The unit of the measurement function

OK: The column for the N.O.K. marking

Remark: Special option, e.g. resolution for maximum scan functions

Grid specifics

LIMES uses 4 different grids for the display of this kind of function tables

- ❑ Main form: The display on the LIMES main window
- ❑ Program library: The display in the selection of test data or test programs when opening a test data or test program database
- ❑ Program execution: The grid displayed during execution of a test program
- ❑ Test report: The grid shown in printed protocols

The 4 small examples on the right side of the window show the effect for the selection of the individual grids.

Unify grids

Although each of the 4 grids can be defined individually, sometimes it is useful to make all grids look alike. To unify grid

- ❑ Mark the grid which you want to choose as basis with the circular check mark
- ❑ Mark the grids which you want to look like the one mentioned above with the rectangular check box

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❑ Click on Unify selected grids

Size grids

To change the width of the grid columns move the mouse pointer to the example grid on top of the window. Click on the gap between the items in the headline and drag the mouse to left or right, re-sizing the columns in this way.

As Windows does not re-size the other columns to keep the full table width the same, the LIMES program has to re-calculate the width of each column after re-sizing. To do so just click somewhere into the example grid.

To make all columns having the same width, click on the Make same size button.

Data format

For each table the data format of values can be specified individually.
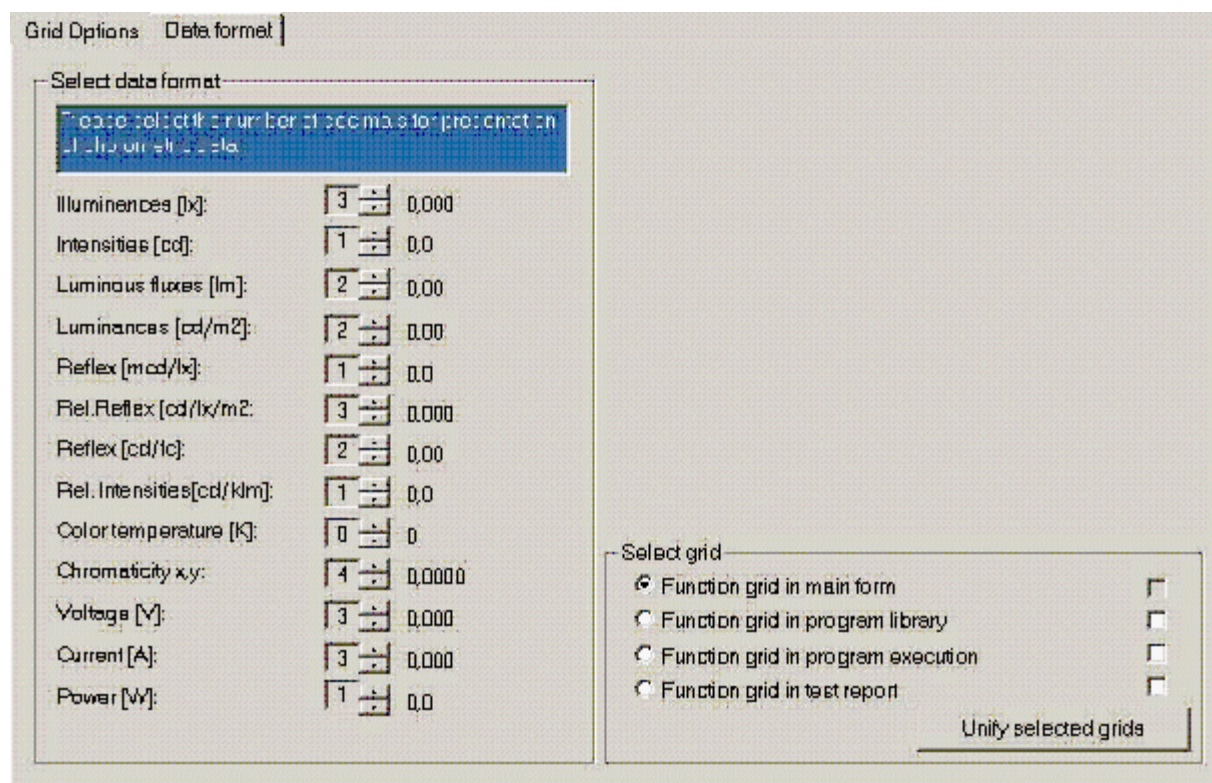
Enter the number of digits for the listed value in the input field, or click on the Up-Down arrow buttons to increase or decrease the number of displayed digits

You can unify data format for the different grids as mentioned above.

Terminate grid options

To end and accept modifications click on O.K. To throw away any changes in the actual selected grids, which was not saved using the Save or Save as button, click on Cancel

Show program function

Show program function options can be set in the LIMES main menu item Configurations.

This option allows to set the properties of program function fields when evaluating a test program in a isoline diagram.
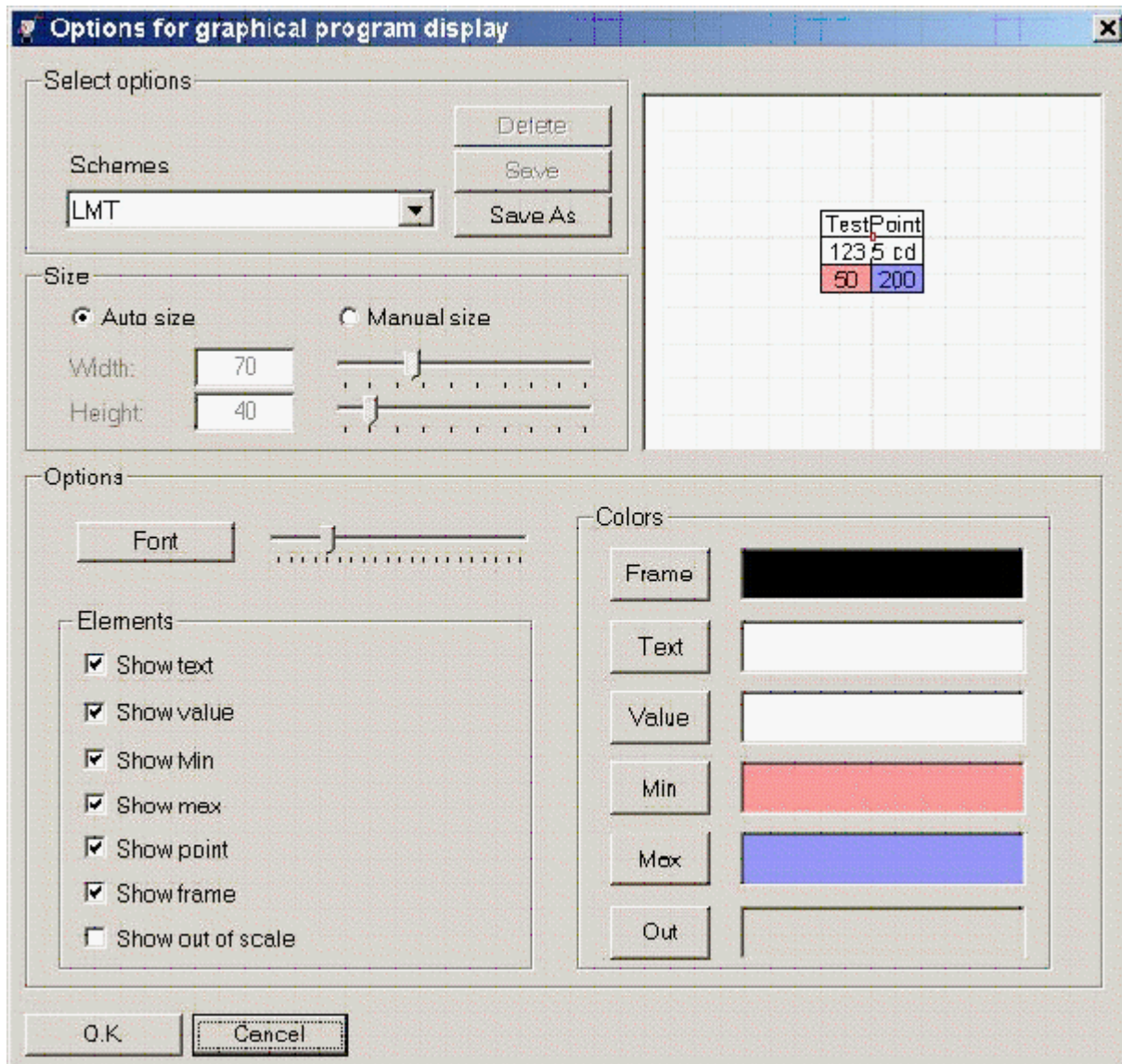
Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Options

Size: Define the size of the area used to show the specifics of a test program function within a graphical display

Elements: Define the elements presented for the program function

Colors: Set colors for area background or text and lines

Configurations: Program flow

The program flow window is a part of the Configurations window.

The program flow window allows the editing and selection of configurations for the procedure of program execution.
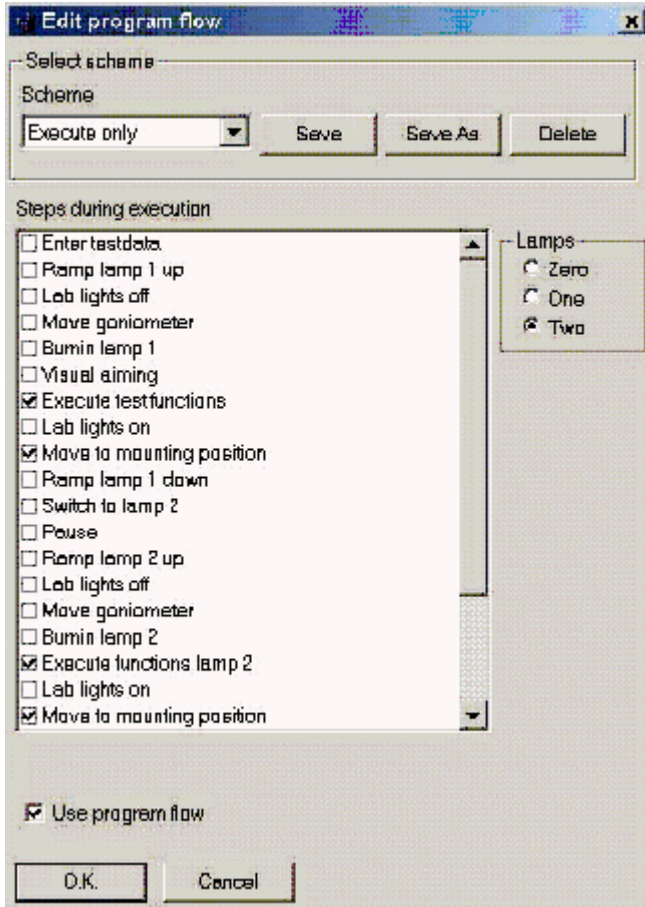
Select scheme: Program flows are stored in the options database as sets of configurations with a given name. The user can select a configuration from the list of available sets. Modified or new configurations can be saved with the same or a new name

Save: Save the modified scheme with the same name (here: Execute only)

Save as: Save the configuration with a different name (here LMT another test)
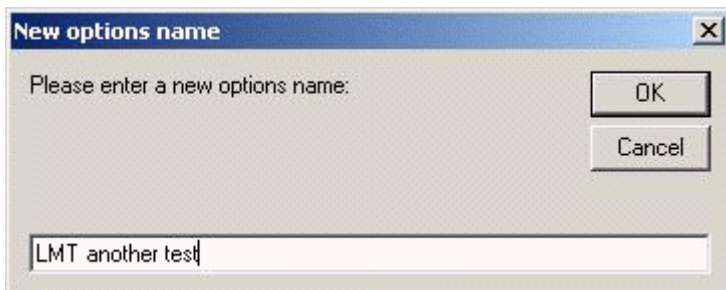
Delete: Deletes the configuration from the database

Steps during execution: The list of steps performed in a program execution is displayed. The list depends whether no lamp (for testing e.g. a reflex reflector), one lamp (single lamp in a floodlight) or two lamps (two lamps or filaments operated one after the other as in an automotive headlamp with low and high beam) are used in the test. The items marked in the list are performed, the ones without a mark are skipped. Change marking by clicking into the small square in front of the items name.

Lamps: Steps of the program flows can be selected depending if the sample contains one, two or no lamps.

Use program flow: If marked (enabled), the selected program flow is active and will be used. If not, it has to be enabled before starting the execution.

> *Note:*
>
> *More information about the concept of program flow can be found in the general section of the LMT LIMES 2000 operation manual*

Program flow concept

File lists

The LIMES program allows the display of measured values of multiple files on one table. Each file is shown in one column of the table, while the rows contain the functions of the files.

File list options can be set in the LIMES main menu item Configurations, but also during evaluation of test data as option settings.

The file lists allow the specifics:

❑ Inserting other items than test values in columns

❑ Adding new columns with statistical analysis of the files selected

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

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Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Additional items

The left table shows the list of additional items which can be inserted on top of the test values list in the resulting file list table. The items which shall be inserted have to be marked and appear in the actual items list

Options

The options list contains the list of additional columns of the resulting file list. The items which shall appear have to be marked

Print options

The file list table can be formatted by entering the width of the columns or by other options as shown above.

Data format

For each table the data format of values can be specified individually.

Enter the number of digits for the listed value in the input field, or click on the Up-Down arrow buttons to increase or decrease the number of displayed digits

Terminate grid options

To end and accept modifications click on O.K. To throw away any changes in the actual selected grids, which was not saved using the Save or Save as button, click on Cancel

Table options

Table options can be set in the LIMES main menu item Configurations, but also during evaluation of test data as option settings.

There are several pages in this window to be selected by clicking on the tab on top of the window.

Any table options are saved as a configuration with a certain name into the options database.

The table options for the test sample data allow the modification of the layout of the sample description data on top of a test protocol.

Select scheme: Select a scheme from the available set of configurations

Delete scheme: Delete a scheme from the available set of configurations

> *Note:*
> *A scheme with the name LMT belongs to the system and cannot be deleted*

Save: Saves the modified configurations under the actual name

Save As: Saves the modified configurations under new name

Style: Select border styles for the table

Tables

This window is used to format data tables which are part of a test protocol (light distributions, zonal flux tables, etc.)
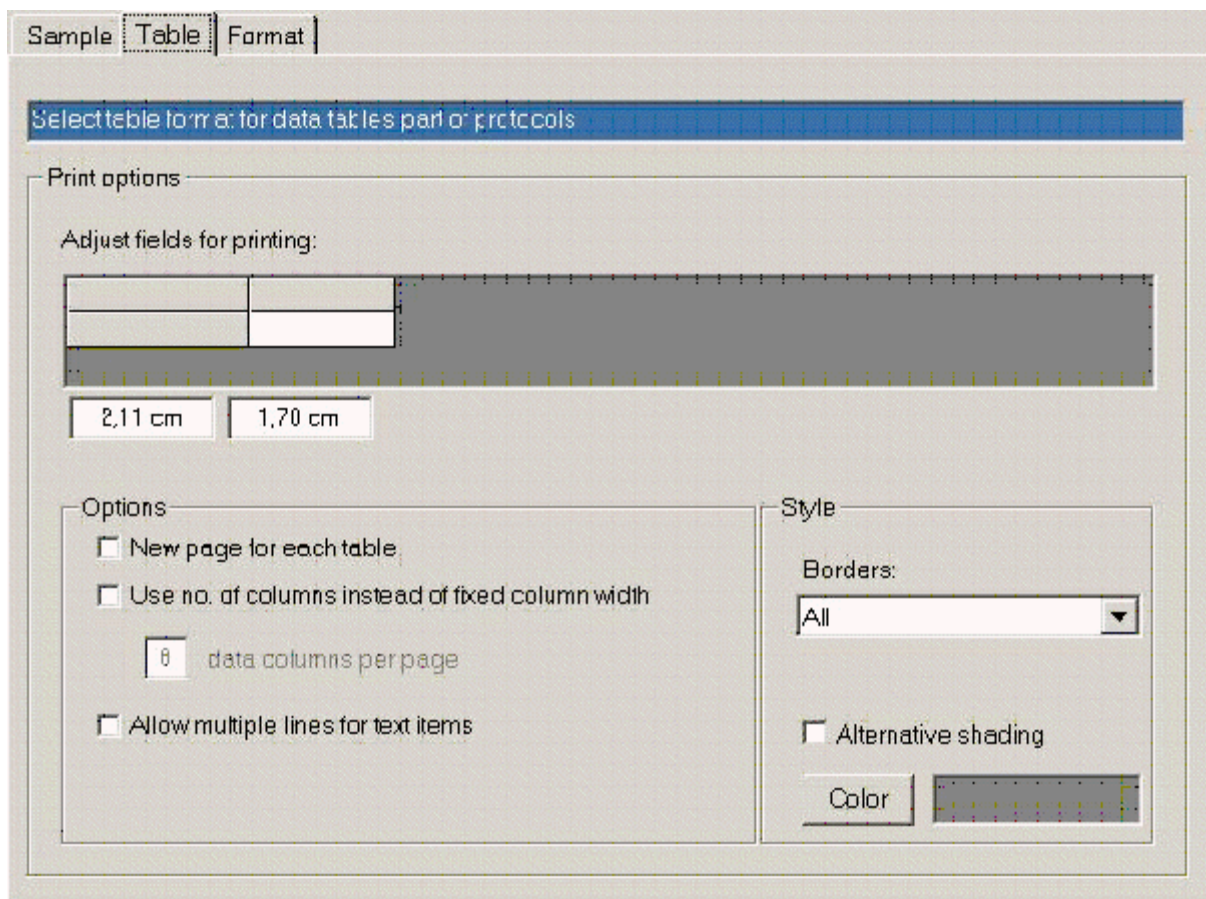
The table can be formatted by entering the width of the columns or by other options as shown above.

Data format

With the format options the decimal presentation of photometric and other data can be defined.

Sample | Table | Format

Select data format

Please select the number of decimals for presentation of chromatic data:

Illuminances [lx]:	3	0,000
Intensities [cd]:	1	0,0
Luminous fluxes [lm]:	2	0,00
Luminances [cd/m2]:	2	0,00
Reflex [mcd/lx]:	1	0,0
Rel.Reflex [cd/lx/m2:	3	0,000
Reflex [cd/fc]:	2	0,00
Rel. Intensities[cd/klm]:	1	0,0
Color temperature [K]:	0	0
Chromaticity x,y:	4	0,0000
Voltage [V]:	3	0,000
Current [A]:	3	0,000
Power [W]:	1	0,0

☑ Mark table values for fulfilment of requirements, if any

Enter the number of digits for the listed value in the input field, or click on the Up-Down arrow buttons to increase or decrease the number of displayed digits

Sample header selection

Sample headers can be selected and edited in the LIMES main menu item Configurations, but also during evaluation of test data as option settings.

Any sample header options are saved as a configuration with a certain name into the sample header database.

The sample header setting for the test sample data allow the modification of the layout of the sample header data on top of a test protocol. A sample header is a table consisting of rows and columns. You can re-design an existing layout or create new layouts. You can change the number of rows and columns, change the contents, as well as the design by assigning individual text fonts and colors for each field of this table.

The configuration LMT is reserved for the still usable LMT default header and cannot be changed, as this header is programmed with fixed data.
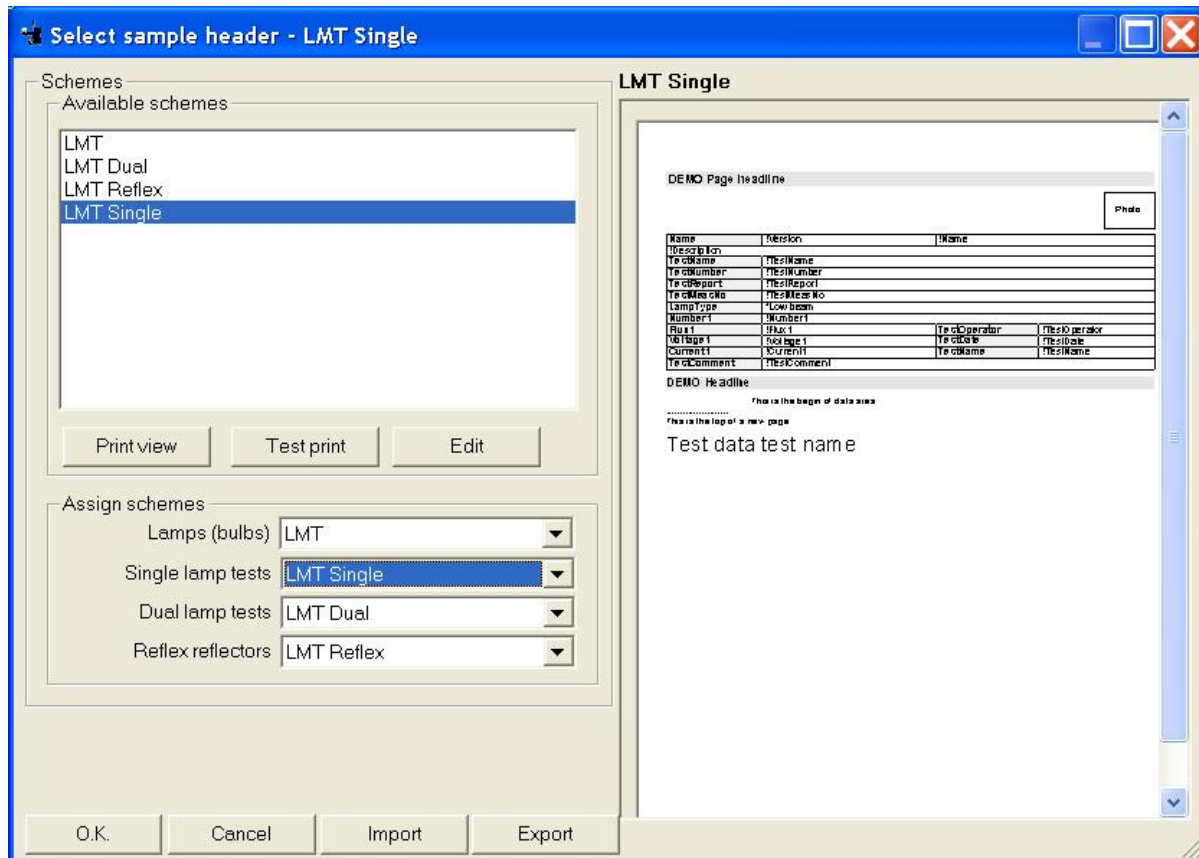
The sample header select window shows the list of available configurations. After clicking on on of the names in the list, the configuration is read from the sample header database, and an example is printed in the page image on the right side of the window.

If you want to export sample headers into ASCII files, you may select more than one name in the list. You can delete a sample header by clicking on the delete key on your keyboard, you also may delete mor than one header at the same time. The delete process starts only after another confirmation.

You can rename a sample header by clicking on the name, than press the F2 key on your keyboard. You cannot select 'LMT' as a new name.

Print view: This shows the sample header on the page image with the actual data of the active test sample data (the test data which was selected at last).

Test print: You can print a test page on the windows printer with the selected sample heder configuration. This requires that a test data file has been loaded prior to this form the database.

Edit: This invokes the sample header editor, where you can design the layout of sample headers.

Assign schemes

Lamps: Select the sample header for lamp protocols

Single lamp tests: Select the sample header for tests with single lamps (automotive lighting only)

Luminaire tests: Select the sample header for tests of luminaires (general lighting only)

Dual lamp tests: Select the sample header for tests with dual lamps like low and high beam (automotive lighting only)

Reflex reflectors: Select the sample header for tests without lamps like reflex reflectors (automotive lighting only)

Import / Export

The Import/Export functions allows the LIMES users to interchange configurations for sample headers between different LIMES installations, or for backup purposes

Import: You can import sample header configurations which have been saved by using the export key and save them into the actual sample header database.

Export: You can export sample header configurations into ASCII files. Multiple selections are possible. The file format is defined by the LIMES program.

Edit sample headers

Editing sample headers can be started by clicking on the Edit button on the Select sample header window.

General

A sample header consists of a table with a number for rows and columns, at least one row and one column is necessary. Above the header table may appear a page headline, below the table a headline with the name of the following table. Photos of the test sample (if available) my appear and can be re-sized. The following settings apply and actions can be performed:

- ❑ The table fills the space between the left and the right margin of the printed page.
- ❑ Columns sizes can be changed by clicking on the column borders in the page picture and dragging the border to the left or the right
- ❑ Field borders can be selected acc. to pre-defined styles
- ❑ Fields of the table can be connected to each other (columns or row span). If borders of the table fields are generally visible, they disappear between spanned fields.
- ❑ The field content can either be text, value, or user defined (see definitions below)
- ❑ Each field can be formatted individually by positioning the content in the field, changing text font, text color and background color of the field

The contents of the fields are usually the data fields of the test data. Each data field has a description and a value. The fields have the following meaning:

- ❑ Text: This shows the description for a certain data of the test sample data
- ❑ Value: This shows the value of the data field

Example:
A data field of the test sample data is e.g. the measured voltage of the test lamp in use. The text in this case could be **"Voltage:"***, the value could be* **"13.2"** *or* **"230"**

- ❑ User: The user can enter any text, which will always appear in this field in the sample header table. A different user text can be entered for any print language available in the LIMES software.

The sample header editor looks like follows:

The top sections shows a picture of the sample header, as it appears on the printer. The lower section contains all controls to modify or edit the selected sample header and shows different tabs (Table, Cells, and Headlines)

Save: This saves all modifications without confirmation under the selected name into the sample header database.

Save As..: This allows to save the actual sample header under a new name.

Print view: This shows the sample header in the upper picture with the actual data of the actual available test data in the computers memory.

> *Note:*
> *It is recommended to select and load a useful test data file from the LIMES test database before you start editing*

Test print: You can print a test report of the actual test data with the sample header which is currently loaded and under modification, so that you can immediately see the effect of your changes.

> *Note:*
> *It is recommended to select and load a useful test data file from the LIMES test database before you start editing*

Print language: To see the effect of your modifications, you can select a different print language from the list of available languages.

Schemes

The list show the available configurations in the sample header database. Click on the name loads the configuration from the database and shows the sample header in the page picture.

To rename press F2 on your keyboard and enter a new name.

To delete press the delete key on your keyboard.

Report lists

Report list options can be set in the LIMES main menu item Configurations.

This option allows to arrange the order of printed reports when presented in the Select reports window.
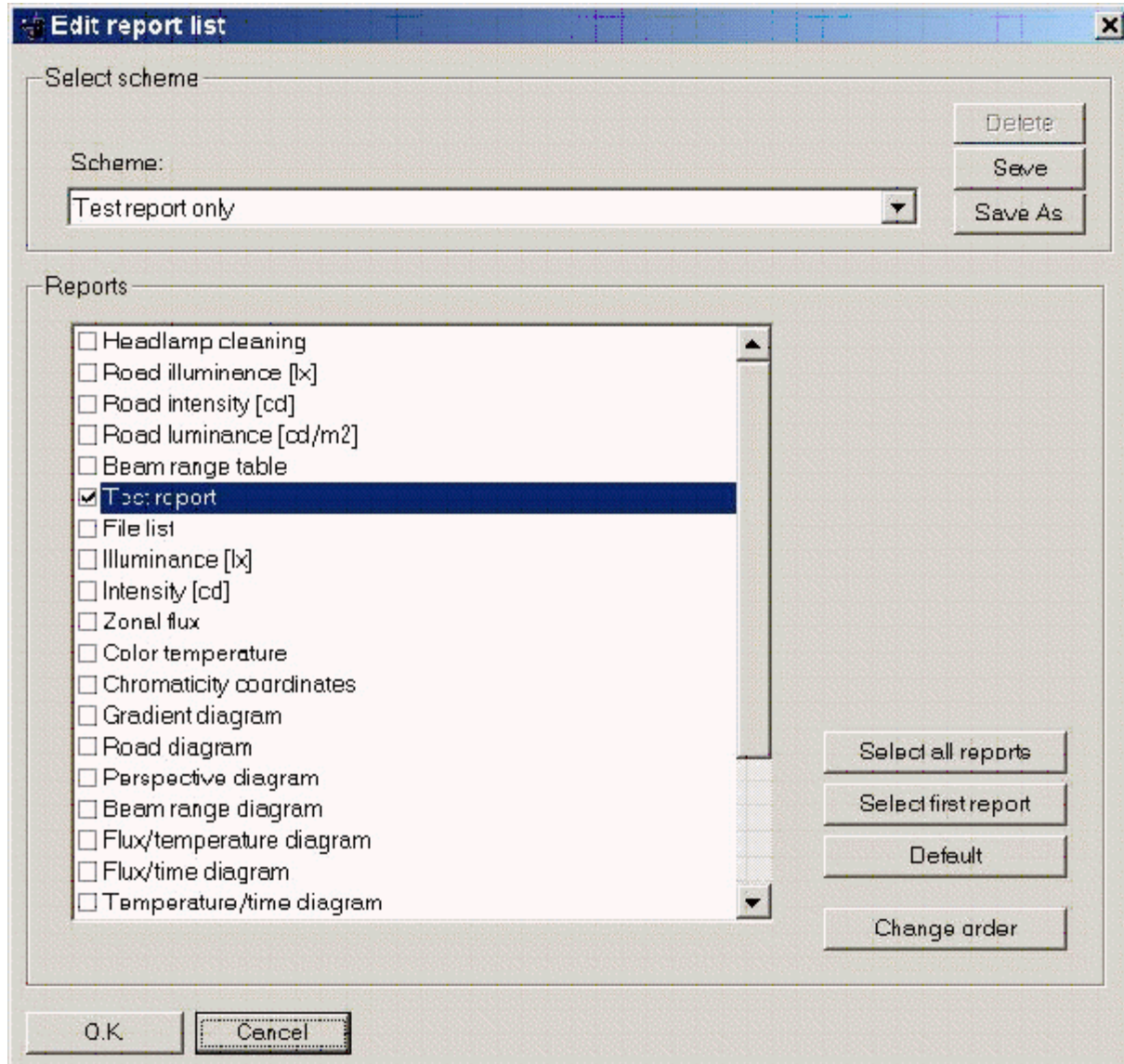
Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Reports

Mark the reports you want to appear in a certain report list. Use Select all reports or Select first reports to set or clear the markings.

Change order

You can change the order in which the selected reports appear in the select list. See more information in the Appendix: Sort Items.

Polar diagrams

Polar diagram options can be set in the LIMES main menu item Configurations as well as during evaluation of test data with polar diagrams

This option allows to configure the presentation of polar diagram lines.

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Lines presentation

No.: The order number of the line to be shown

Plane: The value of the line

Color: The color in which the line is drawn. Click on the field to select the color

Width: The width of the line

Style: The style of line as shown as in the example right of the input field

Note: Styles can only be shown for widths of 1

Fill color: The color used for area filling below the line. Click on the color box to change. Check the box if color filling shall be used

Symmetry: Select whether the lines shall be presented as symmetric. The original values are not changed

Planes

Select the number of lines for the table above

Unit

Select the unit for the lines. If cd is selected, the lumen basis can be specified

Execute polar diagrams

Execute polar diagram options can be set in the LIMES main menu item Configurations as well as during program execution (general lighting only)

This option allows to configure the presentation of execute polar diagram lines.

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Lines presentation

No.: The order number of the line to be shown

Plane: The value of the line

Color: The color in which the line is drawn. Click on the field to select the color

Width: The width of the line

Style: The style of line as shown as in the example right of the input field

Note: Styles can only be shown for widths of 1

Fill color: The color used for area filling below the line. Click on the color box to change. Check the box if color filling shall be used

Symmetry: Select whether the lines shall be presented as symmetric. The original values are not changed

Planes

Always 2 planes

Unit

Select the unit for the lines. If cd is selected, the lumen basis can be specified

Cartesian diagrams

Cartesian diagram options can be set in the LIMES main menu item Configurations as well as during evaluation of test data with polar diagrams

This option allows to configure the presentation of cartesian diagram lines.

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Lines presentation

No.: The order number of the line to be shown

Plane: The value of the line

Color: The color in which the line is drawn. Click on the field to select the color

Width: The width of the line

Style: The style of line as shown as in the example right of the input field

Note: Styles can only be shown for widths of 1

Fill color: The color used for area filling below the line. Click on the color box to change. Check the box if color filling shall be used

Symmetry: Select whether the lines shall be presented as symmetric. The original values are not changed

Planes

Select the number of lines for the table above

Unit

Select the unit for the lines. If cd is selected, the lumen basis can be specified

Glare diagrams

Glare diagram options can be set in the LIMES main menu item Configurations as well as during evaluation of test data with glare diagrams

This option allows to configure the presentation of glare diagram lines.

Select scheme

Scheme: Select a pre-defined scheme from the database

Delete: Delete the selected scheme

Save: Save any modification in the selected scheme

Save as: Allows the input of a new name for the scheme, and saves the actual scheme under this new name

Lines presentation

No.: The order number of the line to be shown

Plane: The value of the line

Color: The color in which the line is drawn. Click on the field to select the color

Width: The width of the line

Style: The style of line as shown as in the example right of the input field

Note: Styles can only be shown for widths of 1

Fill color: The color used for area filling below the line. Click on the color box to change. Check the box if color filling shall be used

Symmetry: Select whether the lines shall be presented as symmetric. The original values are not changed

Planes

Select the number of lines for the table above

Unit

Select the unit for the lines. If cd is selected, the lumen basis can be specified

Hardware options

Hardware options

The hardware options window is a part of the Start options window.

The hardware options allow the setting of all hardware parameters
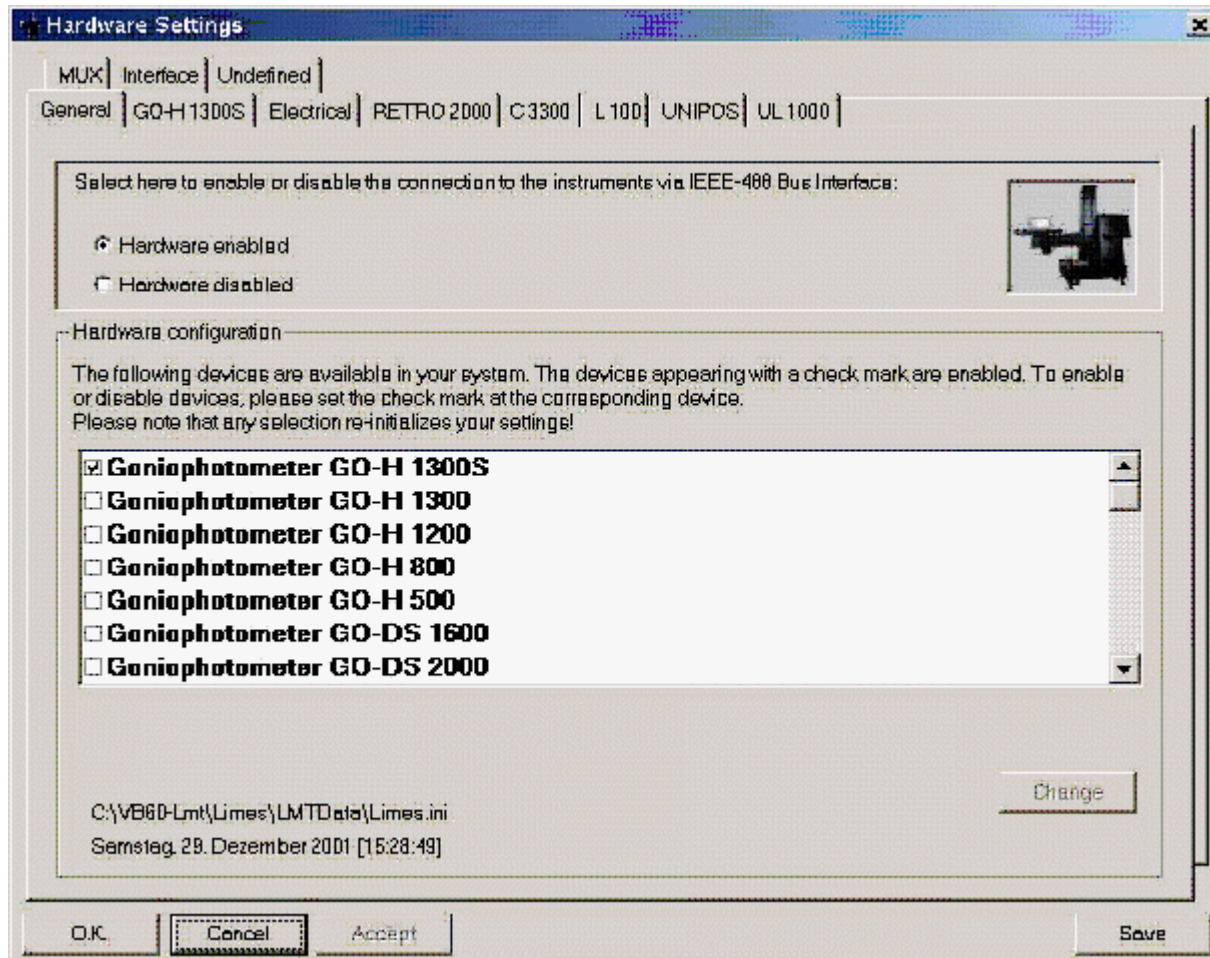
The tabs on top of the window allow the selection of the device for individual editing.

Hardware enabled/disabled

If the hardware is disabled, no communication is send to a device via interface. An control command or data acquisition command is simulated by arbitrary values

> *Note:*
> *Disabled hardware is the default mode after installation of LMT LIMES 2000 software.*

- *Disabled hardware can be used for demonstration of measurements (demo version)*
- *After changing the enable status the LimesControl program has to be initialized*

Hardware configuration list

This list shows all available devices in the system. All devices checked in this list are active and can be used. Unchecked devices cannot be edited or used. After changing the status of a device the Accept button has to be clicked before the device appears selectable for editing.

> *Note:*
> *If is possible that more than one goniometer is available in the system, but only one can be active. This also applies for retro reflex measurement units, colorimeters, etc., e.g. instruments belonging to the same family. Power supplies and electrical measurement instruments are handled differently and therefore more of one unit can be active.*

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Change:

It is possible to change the device name in the list. Click on the Change button for modification. This action has to be selected very carefully to avoid strange results.
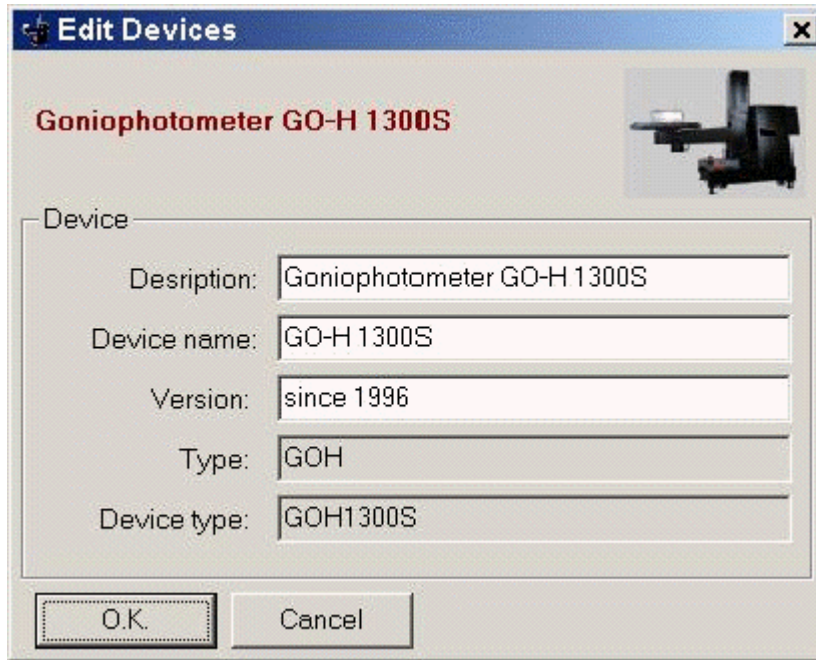
You can change only the description, device name, and version of the selected device.

Accept:

Any modifications made in the hardware list must be accepted before editing the device.

O.K.:

Close the hardware window and continue with the program. Any modifications are accepted and used afterwards. Modifications cannot be used at a new program start or by LimesControl until saved.

Save:

Close the hardware window and continue with the program. Any modifications are accepted and used afterwards. Modifications are saved into the actual Limes.ini file and are available for LimesControl and at any new program start.

> *Note:*
>
> *If the Limes program is connected to LimesControl, you are requested to initialize the LimesControl program to use any modifications in the hardware settings.*
>
> *If the Limes program is not connected to LimesControl, you have to initialize LimesControl manually from the Limes program after connection or from LimesControl program main or popup menu.*

Goniophotometer (GO-H 1300)

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the general page of the hardware options window*

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-H 800**
- ❑ **GO-H 1200**
- ❑ **GO-H 1300**
- ❑ **GO-H 1300S**

Other goniophotometers see in their corresponding chapters.

Default photometer head: Select the default head used automatically from LimesControl at program start, if more than one head is available

Test distance: Actual photometric distance from goniophotometer center to front surface of the photometer head give in m (a different value for each available head)

Test screen distance: (Automotive lighting only). Each illuminance measured with the goniophotometers photometer is converted to a vertical illuminance on a test screen located at the given test screen distance at the corresponding angular position. The illuminance conversion takes the distance and angles of incidences into account.

Photometer unit: Select if present or not. Some goniometers might be used without photometer unit, e.g. for retro reflex device measurements.

Photometer: Click here to access the photometer options window

Goniometer: Click here to access the goniometer options window

LMT Default: Sets LMT default values to this hardware device
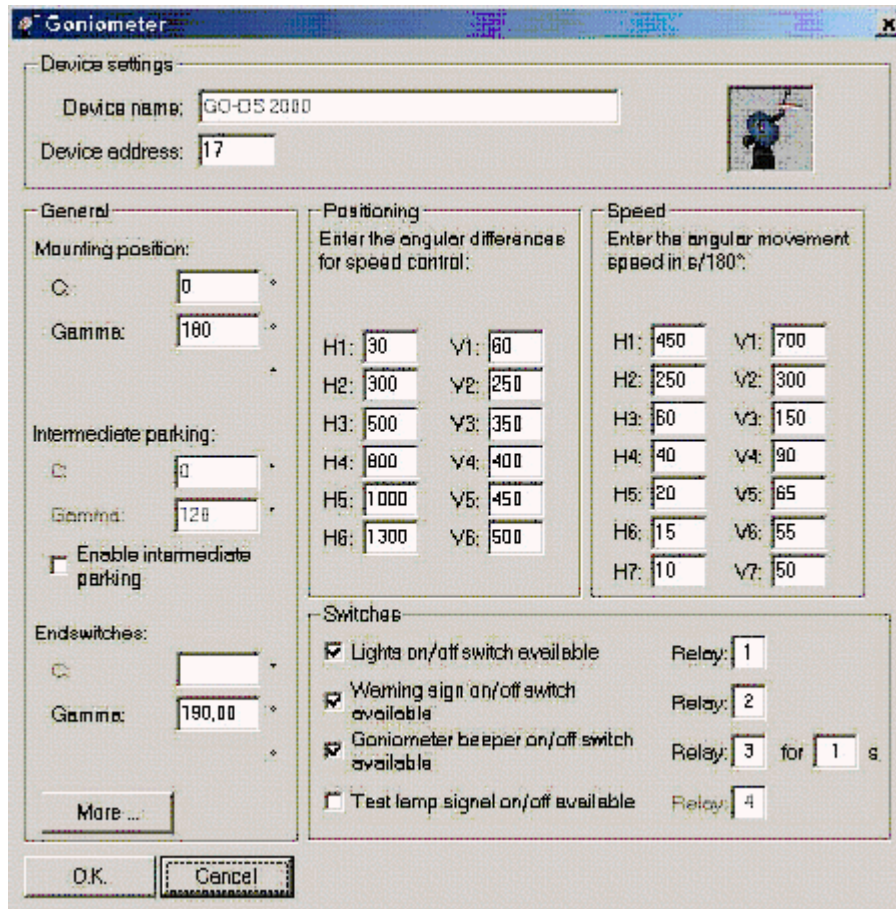
Photometer (GO-H 1300)

This window is accessed by clicking on the Photometer button in the hardware options goniophotometer window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

- **GO-H 800**
- **GO-H 1200**
- **GO-H 1300**
- **GO-H 1300S**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

No. of photometer heads: Select the available number of heads connected to the photometer unit

Display unit: Enter the highest range for each position of the cal-switch of the photometer unit. For this act as follows:

- ❑ Switch the photometer unit on
- ❑ Set the switch labeled with Range at the left side of the photometer units front panel to the highest range (the position 1 step left from the Auto-position)
- ❑ Set the switch labeled with Cal. at the left side of the photometer units front panel to the possible positions (left most = position 1, right next = position 2, etc.)
- ❑ Read the figure displayed for the exponent (Exp) in the photometer units display
- ❑ Enter this figure into the corresponding field

Enter also the number of ranges for each position of the cal-switch.

Note:
Wrong values in these fields lead to improper ranging of the goniophotometer and cause severe problems

Max digits: Enter the maximum mantissa of the photometer units display as given by the hardware manual (e.g. 8,192 , older versions of goniophotometers maybe 4.096 or 1.999)

Select photometer head: Allows the selection of the head to be edited

Default positions: Enter the default angular position of the head, when the goniometer is at absolute Zero position (head offset angle), for bother horizontal and vertical angles (resp. C and Gamma for general lighting applications)

Calibration distance: Enter the distance for which the photometer head is calibrated for cd measurement (usually the actual test distance, but not necessarily the same)

Calibration factor: Enter a factor applied to all values if the check box is marked

Note:
This calibration factor has most severe consequences to the measurement. Apply it only if the calibration of the photometer head requires to be changed but setting could not be done at the head itself (e.g. after checking the calibration on a optical bench by any calibration service institute, which does not dare to change the setting at the photometer but confirms a deviation in the calibration certificate)

Calibration switch setting: Enter the function associated with the second position of the cal-switch on the photometer units front panel. It will be for most cases a switch for lx into cd-measurement, but also a switch for changing the analogue integration time of the head is possible.

Goniometer (GO-H 1300)

This window is accessed by clicking on the Goniometer button in the hardware options goniophotometer window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

❑ **GO-H 800**

❑ **GO-H 1200**

❑ **GO-H 1300**

❑ **GO-H 1300S**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Mounting position: Defines the angular position to which the goniometer returns when the measurement is finished

Intermediate parking: If enabled, the function of moving the goniometer to the mounting position during program execution changes. Instead of moving to the angular position specified as above, the goniometer moves to the position specified in the fields for intermediate parking. A message appears and requests a confirmation by the user before the goniometer moves fianally to the mounting position.

> *Note:*
> *This feature has been added to allow the goniometer to move into a safe position to avoid burning by a powerful floodlight or inserting mechanical tools, such as ladders or stairs in a safe position of the goniometer*

End switches: Location of the end switches at the goniometer axes

Positioning: Enter the angular differences for speed control for each available goniometer movement speed (values are entered by multiplication of the values with the factor 100). The values describe the angular difference between the actual and the final position, at which the goniometer speed is used while automatical moving from a start position to a final position (positioning of the goniometer)

Angular movement speed: The default movement speed for this type of goniometer (values are entered by multiplication of the values with the factor 100). You can perform speed measurement with the goniometer in the LimesControl hardware test

Switches: Mark the switches which are available in the goniophotometer and enter the correct number of the digital output, which is used by the function.

> *Note:*
> *If the function is enabled but not available, a message will appear during execution. If the function is disabled, it will not appear in the program flow*

Light switches: Switch laboratories ambient lights off and on before and after executing the test

Warning signs: Switch warning signs off and on before and after executing the test

Goniometer beeper: Gives the acoustic signal before automatical movement start after stabilization of lamps

> *Note:*
> *This function is required by safety laws*

Test lamp signal: This function can be used to switch on and off test lamps in a goniophotometer before and after test

> *Note:*
> *This function could be used if no computer controlled power supply is available in the system*

Computer Controlled Table CCT

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

The settings in the window are valid for the CCT's which are available for goniophotometers of the type GO-H 1300.

The CCT usually contains three independent devices to move the table into 3 different directions. The devices are:

- ❑ **CCT- X Table movement horizontally left – right**
- ❑ **CCT- Y Table movement horizontally forward – backwards**
- ❑ **CCT- Z Table movement vertically up – down**

The CCT is internally operated by three minicomputers which are build into the back side of the goniophotometers mechanical base. These computers generally serve the push buttons at the goniophotometers side panel and allow the user to manually control the table and move it into all directions. The movement is performed as long as the push buttons are pressed.

The minicomputers themselves can be programmed and controlled via serial interfacing. As only maximal two serial ports are available on PCs, LMT has chosen the conversion of the serial interfacing into IEEE-488 GPIB. This is done by a multi channel converter which is placed inside the goniophotometers control rack.

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Each channel of the converter, responsible for the control of each minicomputer and therefore each table movement, is connected to the interface board using the secondary device capabilities of the IEEE-488 interface.

In this configuration the converter is set to a single interface device address, but each connected unit can to be controlled by a secondary device address.

The CCT's reaction on computer instructions is usually fast, so no waiting period after sending control commands are required. The default waiting period after move commands however is 100 ms. These values should be used. If increased, the control cycle is more slowly. If the waiting period after move is decreased to lower values, it might happen that the system hangs up and the program reports interface timeouts.

For test purposes each of the units can be disconnected by the software, if the enable checkbox is not marked. The values shown in the above window are the LMT default settings.

> *Note:*
> *As there are no usable controls in the LimesControl program, it is generally not necessary to show the CCT panel in the LimesControl display window.*

Goniophotometer (GO-DS 2000)

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-DS 1600**
- ❑ **GO-DS 2000**
- ❑ **GO-FI 2000**

Other goniophotometers see in their corresponding chapters.

Default photometer head: Select the default head used automatically from LimesControl at program start, if more than one head is available

Test distance: Actual photometric distance from goniophotometer center to front surface of the photometer head give in m (a different value for each available head)

Photometer unit: Select if present or not. Some goniometers might be used without photometer unit, e.g. for retro reflex device measurements.

Photometer: Click here to access the photometer options window

Goniometer: Click here to access the goniometer options window

LMT Default: Sets LMT default values to this hardware device

Photometer (GO-DS 2000)

This window is accessed by clicking on the Photometer button in the hardware options Goniophotometer GO-DS 2000 window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-DS 1600**
- ❑ **GO-DS 2000**
- ❑ **GO-FI 2000**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Note:

To detect an unknown device address use the hardware test options of the LimesControl program.

No. of photometer heads: Select the available number of heads connected to the photometer unit

Display unit: Enter the highest range for each position of the cal-switch of the photometer unit. For this act as follows:

- ❑ Switch the photometer unit on
- ❑ Set the switch labeled with Range at the left side of the photometer units front panel to the highest range (the position 1 step left from the Auto-position)
- ❑ Set the switch labeled with Cal. at the left side of the photometer units front panel to the possible positions (left most = position 1, right next = position 2, etc.)
- ❑ Read the figure displayed for the exponent (Exp) in the photometer units display
- ❑ Enter this figure into the corresponding field

Note:

Wrong values in these fields lead to improper ranging of the goniophotometer and cause severe problems

Max digits: Enter the maximum mantissa of the photometer units display as given by the hardware manual (e.g. 8,192 , older versions of goniophotometers maybe 4.096 or 1.999)

Select photometer head: Allows the selection of the head to be edited

Default positions: Enter the default angular position of the head, when the goniometer is at absolute Zero position (head offset angle), for bother horizontal and vertical angles (resp. C and Gamma for general lighting applications)

Calibration distance: Enter the distance for which the photometer head is calibrated for cd measurement (usually the actual test distance, but not necessarily the same)

Calibration factor: Enter a factor applied to all values if the check box is marked

Note:
This calibration factor has most severe consequences to the measurement. Apply it only if the calibration of the photometer head requires to be changed but setting could not be done at the head itself (e.g. after checking the calibration on a optical bench by any calibration service institute, which does not dare to change the setting at the photometer but confirms a deviation in the calibration certificate)

Calibration switch setting: Enter the function associated with the second position of the cal-switch on the photometer units front panel. It will be for most cases a switch for lx into cd-measurement, but also a switch for changing the analogue integration time of the head is possible.

Goniometer (GO-DS 2000)

This window is accessed by clicking on the Goniometer button in the hardware options Goniometer GO-DS 2000 window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-DS 1600**

- ❑ **GO-DS 2000**

- ❑ **GO-FI 2000**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Mounting position: Defines the angular position to which the goniometer returns when the measurement is finished

End switches: Location of the end switches at the goniometer axes

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Positioning: Enter the angular differences for speed control for each available goniometer movement speed (values are entered by multiplication of the values with the factor 100). The values describe the angular difference between the actual and the final position, at which the goniometer speed is used while automatical moving from a start position to a final position (positioning of the goniometer)

Angular movement speed: The default movement speed for this type of goniometer (values are entered by multiplication of the values with the factor 100). You can perform speed measurement with the goniometer in the LimesControl hardware test

Goniophotometer (GO-V1900)

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-V 1900**

Other goniophotometers see in their corresponding chapters.

Default photometer head: Select the default head used automatically from LimesControl at program start, if more than one head is available

Test distance: Actual photometric distance from goniophotometer center to front surface of the photometer head give in m (a different value for each available head)

Photometer unit: Select if present or not. Some goniometers might be used without photometer unit, e.g. for retro reflex device measurements.

Photometer: Click here to access the photometer options window

Goniometer: Click here to access the goniometer options window

LMT Default: Sets LMT default values to this hardware device

Photometer (GO-V 1900)

This window is accessed by clicking on the Photometer button in the hardware options Goniophotometer GO-V1900 window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-V 1900**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

No. of photometer heads: Select the available number of heads connected to the photometer unit

Display unit: Enter the highest range for each position of the cal-switch of the photometer unit. For this act as follows:

- ❑ Switch the photometer unit on

❑ Set the switch labeled with Range at the left side of the photometer units front panel to the highest range (the position 1 step left from the Auto-position)

❑ Set the switch labeled with Cal. at the left side of the photometer units front panel to the possible positions (left most = position 1, right next = position 2, etc.)

❑ Read the figure displayed for the exponent (Exp) in the photometer units display

❑ Enter this figure into the corresponding field

Enter also the number of ranges for each position of the cal-switch.

> *Note:*
> *Wrong values in these fields lead to improper ranging of the goniophotometer and cause severe problems*

Max digits: Enter the maximum mantissa of the photometer units display as given by the hardware manual (e.g. 8,192 , older versions of goniophotometers maybe 4.096 or 1.999)

Select photometer head: Allows the selection of the head to be edited

Default positions: Enter the default angular position of the head, when the goniometer is at absolute Zero position (head offset angle), for bother horizontal and vertical angles (resp. C and Gamma for general lighting applications)

Calibration distance: Enter the distance for which the photometer head is calibrated for cd measurement (usually the actual test distance, but not necessarily the same)

Calibration factor: Enter a factor applied to all values if the check box is marked

> *Note:*
> *This calibration factor has most severe consequences to the measurement. Apply it only if the calibration of the photometer head requires to be changed but setting could not be done at the head itself (e.g. after checking the calibration on a optical bench by any calibration service institute, which does not dare to change the setting at the photometer but confirms a deviation in the calibration certificate)*

Calibration switch setting: Enter the function associated with the second position of the cal-switch on the photometer units front panel. It will be for most cases a switch for lx into cd-measurement, but also a switch for changing the analogue integration time of the head is possible.

Goniometer (GO-V 1900)

This window is accessed by clicking on the Goniometer button in the hardware options Goniophotometer GO-V1900 window. It is used for the settings of the photometer unit of the goniophotometer in the system, if available.

The settings in the window are valid for the following goniophotometers:

- ❑ **GO-V 1900**

Other goniophotometers see in their corresponding chapters.

Device name: As defined in the hardware list. Can be changed only there in the hardware options general window.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Mounting position: Defines the angular position to which the goniometer returns when the measurement is finished

End switches: Location of the end switches at the goniometer axes

Positioning: Enter the angular differences for speed control for each available goniometer movement speed (values are entered by multiplication of the values with the factor 100). The values describe the

angular difference between the actual and the final position, at which the goniometer speed is used while automatical moving from a start position to a final position (positioning of the goniometer)

Angular movement speed: The default movement speed for this type of goniometer (values are entered by multiplication of the values with the factor 100). You can perform speed measurement with the goniometer in the LimesControl hardware test

Switches: Mark the switches which are available in the goniophotometer and enter the correct number of the digital output, which is used by the function.

> *Note:*
> *If the function is enabled but not available, a message will appear during execution. If the function is disabled, it will not appear in the program flow*

Light switches: Switch laboratories ambient lights off and on before and after executing the test

Warning signs: Switch warning signs off and on before and after executing the test

Goniometer beeper: Gives the acoustic signal before automatic movement start after stabilization of lamps

> *Note:*
> *This function is required by safety laws*

Test lamp signal: This function can be used to switch on and off test lamps in a goniophotometer before and after test

> *Note:*
> *This function could be used if no computer controlled power supply is available in the system*

Power supplies

This window is accessed by clicking on the corresponding tab in the hardware options window.

Power supplies and electrical instruments can be configured with this window. See more information in the chapter for electrical instruments.

> *Note:*
> *The tab label of these devices corresponds to the device name activated in the hardware list on the general page of the hardware options window. These devices can either be power sources or electrical measurement instruments.*
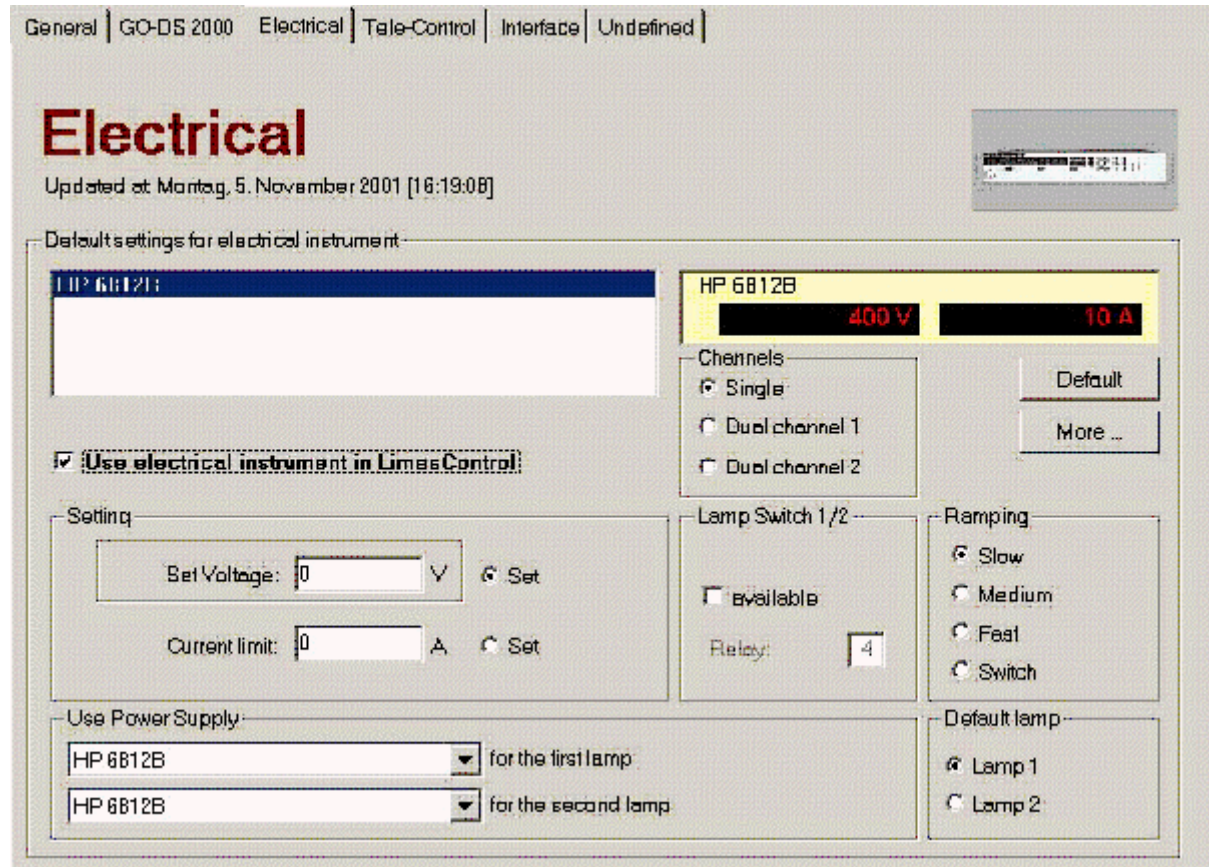
Power supply: As there can be more than one power supply or electrical measurement instrument (any number) in the system, the setting is done for the one selected from the list

> *Note:*
> *To add a new or to delete a power supply use the power supply setting window by clicking on the More button*

Use electrical instrument in LimesControl: If enabled, the power supply or electrical measurement instrument is shown in the main window of the LimesControl program and can be used for lamp control and electrical readings.

Setting: Enter the default voltage or current and the set value, if no special lamp voltage has been selected.

Channels: Select Single channel or Dual channel as available with the power supply

> *Note:*
> *A dual channel power supply is treated as two separate power supplies, as one will be defined with dual channel 1, the other with dual channel 2*

Lamp switch: Enable the available check box if the LMT hardware consists of a controllable switch do connect the output of the power supply either to first or second lamp (low or high beam)

Signal: The number of the relay output at the LMT control rack, which is connected to the lamp switch. As there are generally 4 outputs, it could be either 1, 2, 3, or 4 (default).

Ramping: Ramping the power supply is increasing or decreasing the lamp voltage or current. The speed can be selected to slow, medium, or fast. The selection 'switch' is like switching a lamp on, and can be used for AC operated lamps (gas discharged lamps), which usually do not allow ramping

 Lamp stabilization concept

Use power supply: On test program execution where one part of the functions is executed with one lamp burning, the rest of the functions with the second lamp (as with low beam and high beam headlamps in automotive lighting), you can assign the default power supply for each lamp.

Default lamp: Defines which lamp is used, if only one lamp of a two lamp system is operated.

Default: Sets LMT default power supply or instrument values.

More: Allows the setting of specific values of a power supply, create new or delete existing instruments.

Electrical Instruments

This window is accessed by clicking on the corresponding tab in the hardware options window.

Power supplies and electrical instruments can be configured with this window. See more information in the chapter for power supplies.

> *Note:*
> *The tab label of these devices corresponds to the device name activated in the hardware list on the general page of the hardware options window. These devices can either be power sources or electrical measurement instruments.*
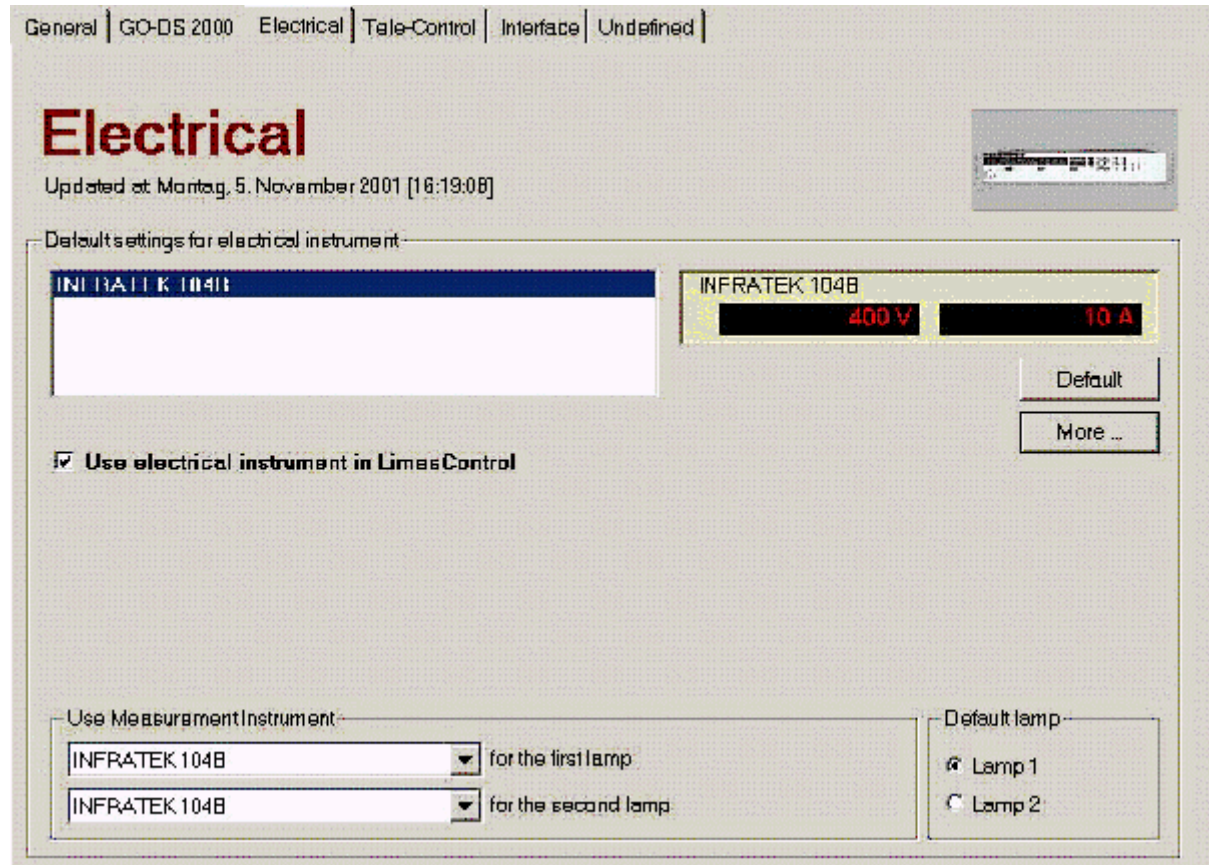
Electrical measurement instrument: As there can be more than one power supply or electrical measurement instrument (any number) in the system, the setting is done for the one selected from the list

> *Note:*
> *To add a new or to delete an electrical instrument use the instruments setting window by clicking on the More button*

Use measurement instrument: On test program execution where one part of the functions is executed with one lamp burning, the rest of the functions with the second lamp (as with low beam and high beam headlamps in automotive lighting), you can assign the default electrical measurement instrument for each lamp.

Default lamp: Defines which lamp is used, if only one lamp of a two lamp system is operated.

Use electrical instrument in LimesControl: If enabled, the power supply or electrical measurement instrument is shown in the main window of the LimesControl program and can be used for lamp control and electrical readings.

Default: Sets LMT default power supply or instrument values.

More: Allows the setting of specific values of an electrical instrument, create new or delete existing instruments.

Electrical instruments options

This window is displayed after clicking the More button in the hardware options for power supplies or electrical measurement instruments,
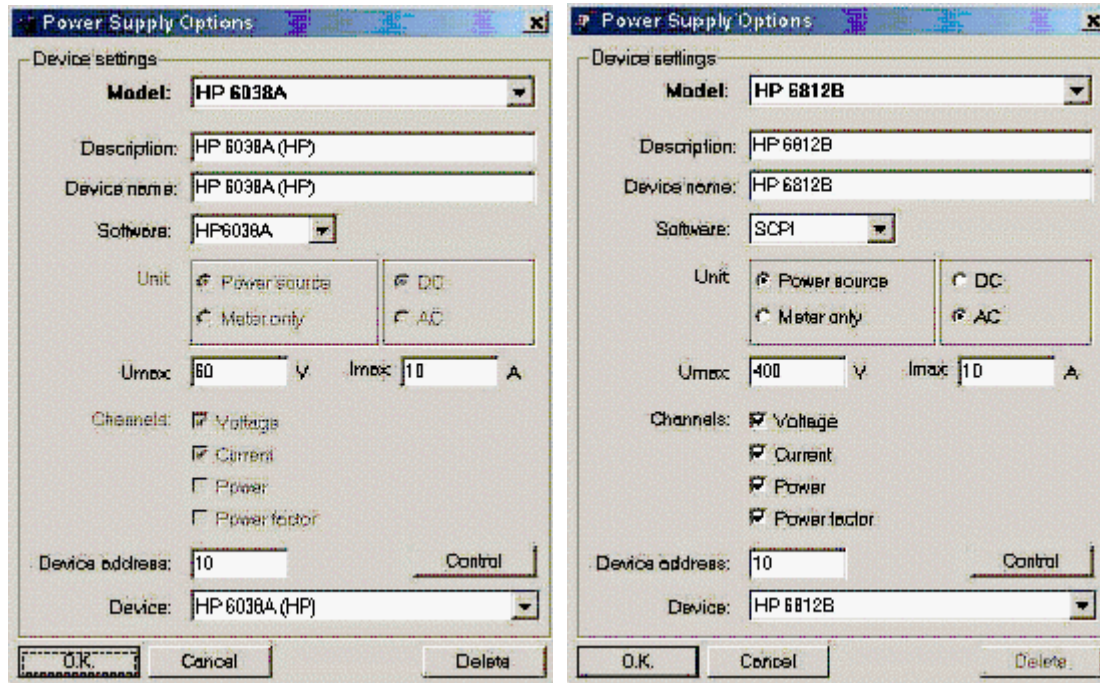
Model: Select the model of the power supply from the drop down list.

Description: Enter the name of the power supply

Device name: Enter a device name for the power supply. The device name is used in the display of the LimesControl main window

Software: The operation software used in this power supply. Refer to the instruments interfacing software manual for explanations.

Unit: Click on Power source, if the instrument is a power source like HP 6038A, HP6812 etc, ofr click on Meter only, if the instrument is a reading instrument only like Infratek 104B etc.

> *Note:*
> *A "Meter only" device cannot control (or set) output voltages or currents, but can only read the electrical values*

DC/AC: Select if the instrument can only handle DC voltages or also AC.

Umax: The instruments maximum voltage

Imax: The instruments maximum current

Channels: Select the available channels of the electrical instrument which you want to use.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Control: Click on this button to get a new window which allows you to enter the control commands used by the software for communication with the instrument.

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Device: Select an existing device if you want to replace its properties with these new values, or select NEW DEVICE to create a new power supply

Delete: Delete the device shown in the device list

Electrical control commands

This window is displayed after clicking the Control button in the options window for power supplies and electrical instruments.
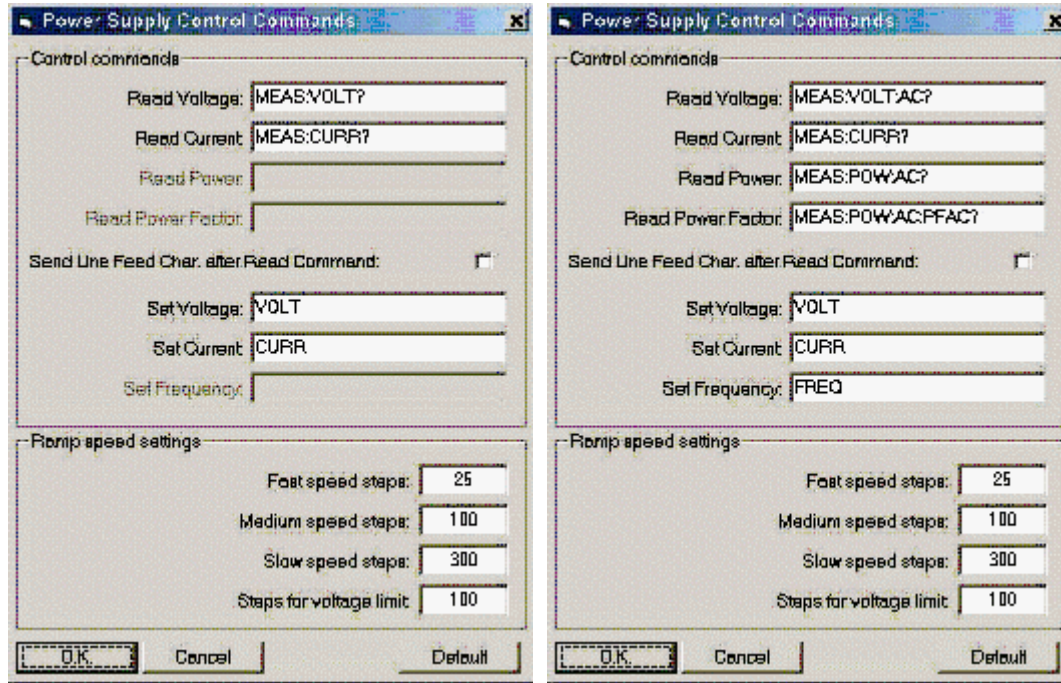
Read Voltage: The command for invoking a voltage reading from the instrument.

Read Current: The command for invoking a current reading from the instrument.

Read Power: The command for invoking a power reading from the instrument.

Read Power Factor: The command for invoking a power factor reading from the instrument.

Send Line Feed …: Click on the box if your instrument requires the sending of an additional line feed character after sending the read command.

> *Note:*
> *As default a line feed character is send after the control string is transmitted to the instrument. Some instrument types, however, require an additional line feed character, e.g. the Toellner SCPI power supply.*

Set Voltage: The command for setting the output voltage (or output voltage limit) of the power supply.

Set Current: The command for setting the output current (or output current limit) of the power supply.

Set Frequency: The command for setting the output voltage frequency of the power supply for AC power sources such as HP 6812.

> *Note:*
> *The control command syntax can usually be found in he GP-IB section of the electrical instruments hardware manual.*

Ramp speed settings: These parameters define the speed of the ramping for power supplies. These values are actually the steps, in which the voltage or current is increased from Zero to the maximum. To increase ramping speeds, reduce the number of steps, to reduce speed, increase them.

Steps for voltage limit: Some power supplies require a slow increase of limiting voltage if the instrument will be used for constant current setting. If your power supply does not give any problems, these steps can be reduced to make the current setting faster.

> *Note:*
> *This problems have been observed with power supplies of Agilent HP 6674 series. Please be careful with this option. Try it with a cheap lamp because an over current may occur with power supplies which are able to deliver high currents*

O.K: Accepts the input and terminates this window.

Cancel: Throws away the input and terminates this window.

Default: Replaces the content of the input fields of this window with the standard setting for the selected device.

RETRO 1000

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the general page of the hardware options window*

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Test distance: The test distance from the goniophotometer center to the front surface of the projector lens

Horizontal / Vertical offset: Enter the default angular position of the unit defined by the center of the projector lens, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
>
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

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Observation: Enable the photometer heads which are available at the given angles.

Special options: Enable second unit if the available RETRO 1000 display unit is connected to two projector units for measurement at two distances

**Default:** Sets LMT default configuration values.

RETRO 2000

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Test distance: The test distance from the goniophotometer center to the front surface of the projector lens

Horizontal / Vertical offset: Enter the default angular position of the unit defined by the center of the projector lens, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl*
> *program.*

Observation: Enable the minimum and maximum observation angles which can be reached by the moving detector of the RETRO 2000, and the angular resolution of the position measurement

Prism: Enable "Prism available" if your RETRO 2000 can be equipped with a prism to get the photometer head closer to the projector, allowing smaller observation angles Enter also the prism offset, which is the angle by which the observation angle is reduced when a prism is used.

Special options: Enable second unit if the available RETRO 1000 display unit is connected to two projector units for measurement at two distances

Default: Sets LMT default configuration values.

C 1210

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Test distance: The test distance from the goniophotometer center to the front surface of the colorimeter head

Horizontal / Vertical offset: Enter the default angular position of the unit, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl*
> *program.*

Options

Options: Enable if the colorimeter is equipped with the option 'Color Temperature Display"

Default: Sets LMT default configuration values.

C 3300

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Test distance: The test distance from the goniophotometer center to the front surface of the colorimeter head

Horizontal / Vertical offset: Enter the default angular position of the unit, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl*
> *program.*

Options

Options: Enable if the colorimeter is equipped with the option 'Color Temperature Display"
Default: Sets LMT default configuration values.

L100

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the general page of the hardware options window*

The special luminance head L100 is generally used in conjunction with a display unit similar to an LMT S1000 photometer. The properties entered here are given for both units, as the luminance head has to special settings.

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Min Control byte: Instead of using the no. of ranges and the maximum available range the lowest addressable range must be entered here

Max Control byte: Instead of using the no. of ranges and the maximum available range the highest addressable range must be entered here

> *Note:*
> *Selecting either ranges or control bytes depends on the available luminance measuring device.*

Test distance: The test distance from the photometrical center of the test sample to the front surface of the lens of the luminance meter.

Horizontal / Vertical offset: Enter the default angular position of the unit, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Secondary address: A value between 0 and 31 is required. This value must correspond to the setting of the interface secondary device address at the hardware device.

> *Note:*
> *If the device is connected with a primary address only, the secondary address must be set to Zero.*

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Options: Select the measuring angle where your measurements have to be done with. It must be available in the luminance meter.

Special options: As the luminance meter is mostly used to measure luminances from illuminated standard material, the reflectance of this material can be entered to allow a conversion of luminance (cd/m^2) into illuminance (lx) values

Default: Sets LMT default configuration values.

L 1009

This window is accessed by clicking on the corresponding tab in the hardware options window.

Note:
The tab label of this devices corresponds to the device name activated in the hardware list on the general page of the hardware options window

General settings

No. of ranges: This figure must match with the number of measurement ranges of the display unit

Maximum range: The highest exponent available in the display unit

Min Control byte: Instead of using the no. of ranges and the maximum available range the lowest addressable range must be entered here

Max Control byte: Instead of using the no. of ranges and the maximum available range the highest addressable range must be entered here

Note:
Selecting either ranges or control bytes depends on the available luminance measuring device.

Test distance: The test distance from the photometrical center of the test sample to the front surface of the lens of the luminance meter.

Horizontal / Vertical offset: Enter the default angular position of the unit, when the goniometer is at absolute Zero position.

IEEE 488

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Secondary address: A value between 0 and 31 is required. This value must correspond to the setting of the interface secondary device address at the hardware device.

> *Note:*
> *If the device is connected with a primary address only, the secondary address must be set to Zero.*

> *Note:*
> *To detect an unknown device address use the hardware test options of the LimesControl program.*

Internal interface: Select which interface is built into the luminance meter.

Options: Select the measuring angle where your measurements have to be done with. It must be available in the luminance meter.

Special options: As the luminance meter is mostly used to measure luminances from illuminated standard material, the reflectance of this material can be entered to allow a conversion of luminance (cd/m^2) into illuminance (lx) values

Default: Sets LMT default configuration values.

Tele-Control

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the general page of the hardware options window*

Settings

SFK Functions: Special function keys are marked on the Telecontrol with F1 to F4. These keys can be programmed to move the goniometer to a certain position.

Position: Enter the text describing the position

H [°]: Enter the horizontal angular position H in deg

V [°]: Enter the vertical angular position V in deg

IEE-488 device address and **IEEE connection** are currently not supported

COM port: enter 1 for COM1, and 2 for COM2 depending to which serial port the Telecontrol is connected

Use serial connection: Always enabled

LMT Default: Use LMT default values for the settings

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MUX

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*
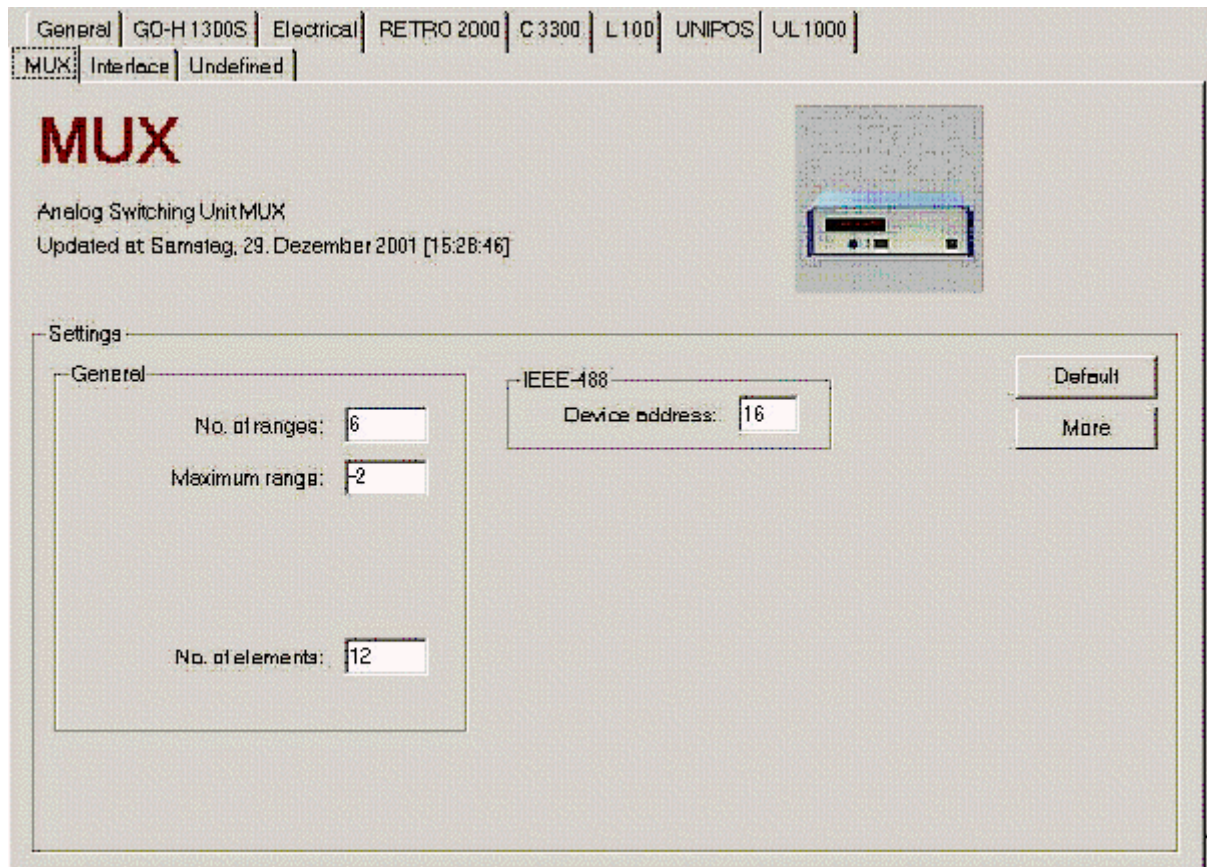
> *Note:*
> *More about photometer head assignment see in the chapter about the MUX S*

MUX S

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

Settings

No. of ranges: Enter the number of measurement ranges of the MUX S-display unit

Maximum range: Enter the maximum range of the MUX S-display unit

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Default: Use LMT default values for the settings

More: This button allows the assignment of photometer heads

Assignment of photometer heads
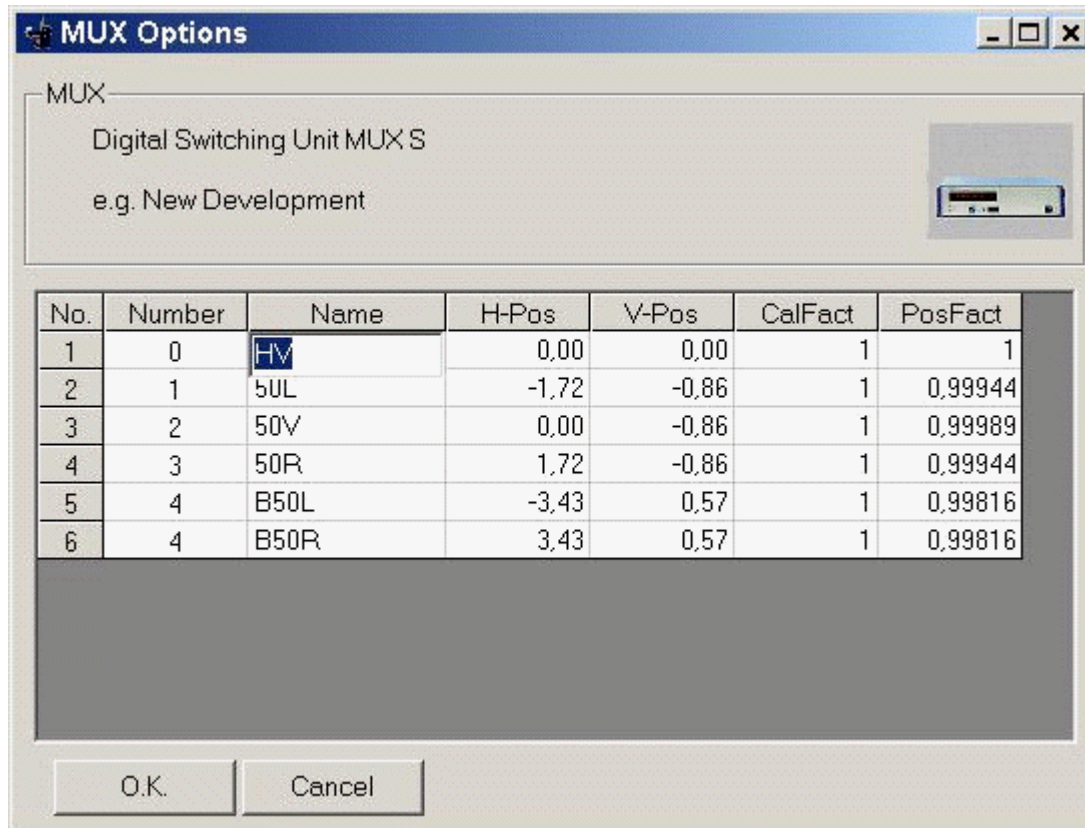
No: The current number of photometer heads

Number: the number of the input socket of the display unit to which the photometer head is connected

Name: A description for the photometer heads position

H-Pos: the horizontal angle position of the photometer head in deg

V-Pos: the vertical angle position of the photometer head in deg

CalFact: The calibration factor for conversion the display of photometer reading of the head into illuminances at the position of the head as mounted

PosFact: The correction factor for the photometer reading of the head taking into account the deviation from vertical position (parallel to the test screen)

XZ-Units

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

XZ-Units are devices for moving a photometer, usually luminance meter L1000 or luminance head L100 into horizontal and vertical positions in front of a measurement area and is used basicly for license plate lamp measurements. The measurement area contains the license plate (dummy) with the test points covered with reflection standard material, such as calibrated blotting paper.

Settings

Horizontal and vertical aiming position: The absolute position in the coordinate system of the XZ-Unit, specified in mm.

Aiming position is: The selection defines the position of the aiming spot on the license plate dummy.

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Integrating spheres

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

The settings in the window are valid for the following integrating spheres:

❑ **UL 1000**

❑ **UL 1500**

❑ **UL 2000**
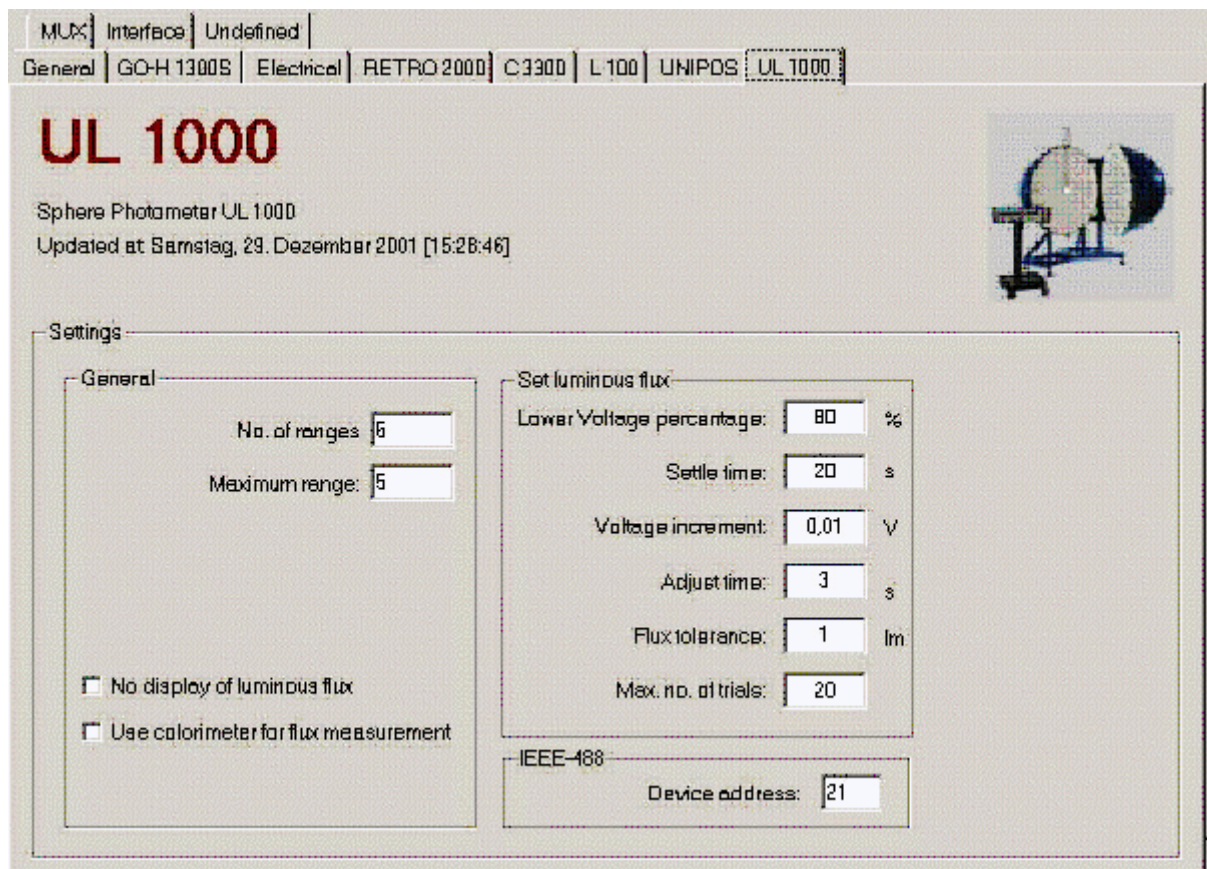
Settings

No. of ranges: The number of measurement ranges of the measurement unit

Maximum range: The highest range (exponent) available on the measurement unit

No display: Check here if the display unit does not contain a photometer unit and is only used to support auxiliary lamp operation and temperature measurement

Use colorimeter: Check here if you always want to use a tristimulous colorimeter, such as C 1200 or C 3300, for flux measurement

Device address: A value between 0 and 31 is required. This value must correspond to the setting of the interface device address at the hardware device.

Set luminous flux

The default values for setting of lamps to a certain luminous flux can be modified here. It is possible to change these values directly during measurement. Please refer to the chapters in the general section about luminous flux measurements with integrating spheres.

Lower Voltage percentage: Enter the percentage for the lower voltage

Settle time: Enter the settle time in s

Voltage increment: Enter the voltage increment in V

Adjust time: Enter the adjust time in s

Flux tolerance: Enter the allowed tolerance for the setting of luminous flux in lm

Max no. of tries: Enter the maximum number of tries if the instability of the lamp does not allow a setting of the luminous flux within the specified tolerance

Interface

This window is accessed by clicking on the corresponding tab in the hardware options window.
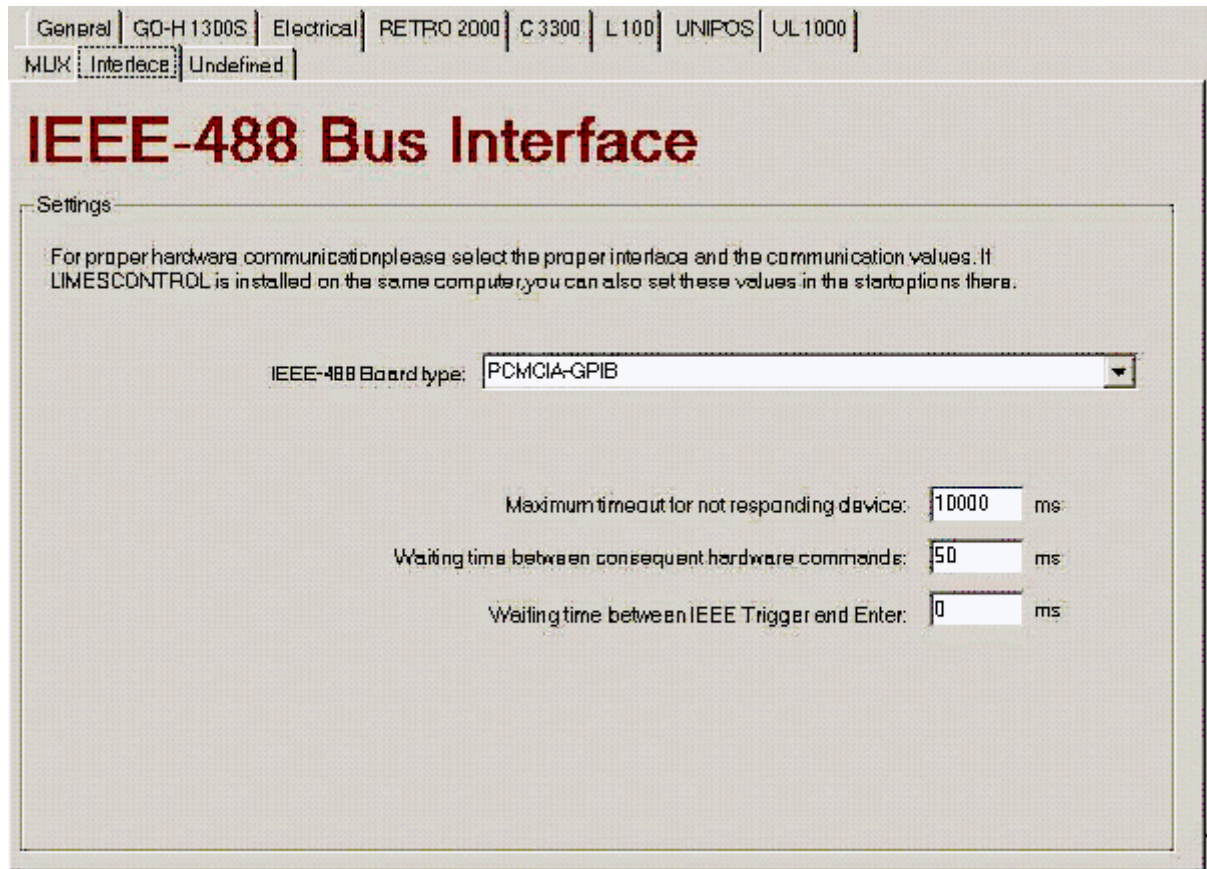
IEEE-488 Board type: Select the board installed in your computer

> *Note:*
> *An IEEE-488 PC interface board requires its operation software (drivers) to be installed and running on the computer. LMT usually delivers boards of the type GTI iPC488-L, the necessary drivers are installed during setup of the LMT LIMES 2000 software. If the user wants to use another board type, he has to install the drivers himself before the board can be used.*

The following message appears always when another board type than the GIT iPC488-L interface is selected from the drop down list:
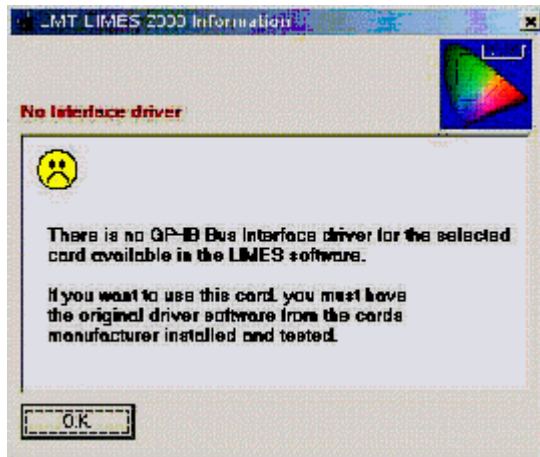
Maximum timeout: The timeout is the time period between a request for data and a response from the interface. If the instrument does not respond due to hardware problems or bad connections, the interface could wait eternally for such a reply from the instrument. The timeout period allows the interface driver to cancel the process and to continue with the program. A message will be displayed indicating the interface problems.

Waiting time between hardware commands: Commands to a hardware device may require a certain time until they are processed. A default value of 50 ms is recommended.

Waiting time between trigger and enter: During data acquisition the interface performs the sending of various commands (trigger) to enable a reading from the instrument (enter). Some devices (especially very old electronics) require a certain time before they can react. This value could be used in those rare cases, the default value is Zero

Undefined device

This window is accessed by clicking on the corresponding tab in the hardware options window.

> *Note:*
> *The tab label of this devices corresponds to the device name activated in the hardware list on the*
> *general page of the hardware options window*

An undefined device is used, if the goniophotometer is used not for measurement with the built-in photometer unit, but to use the goniophotometers movement capabilities to position a measurement sample and then perform a complete different task, may be a measurement with a Spectrum Analyzer, which is not connected to the LMT system.

An undefined device can be used with several test program functions and must be enabled when the program is created (edited).
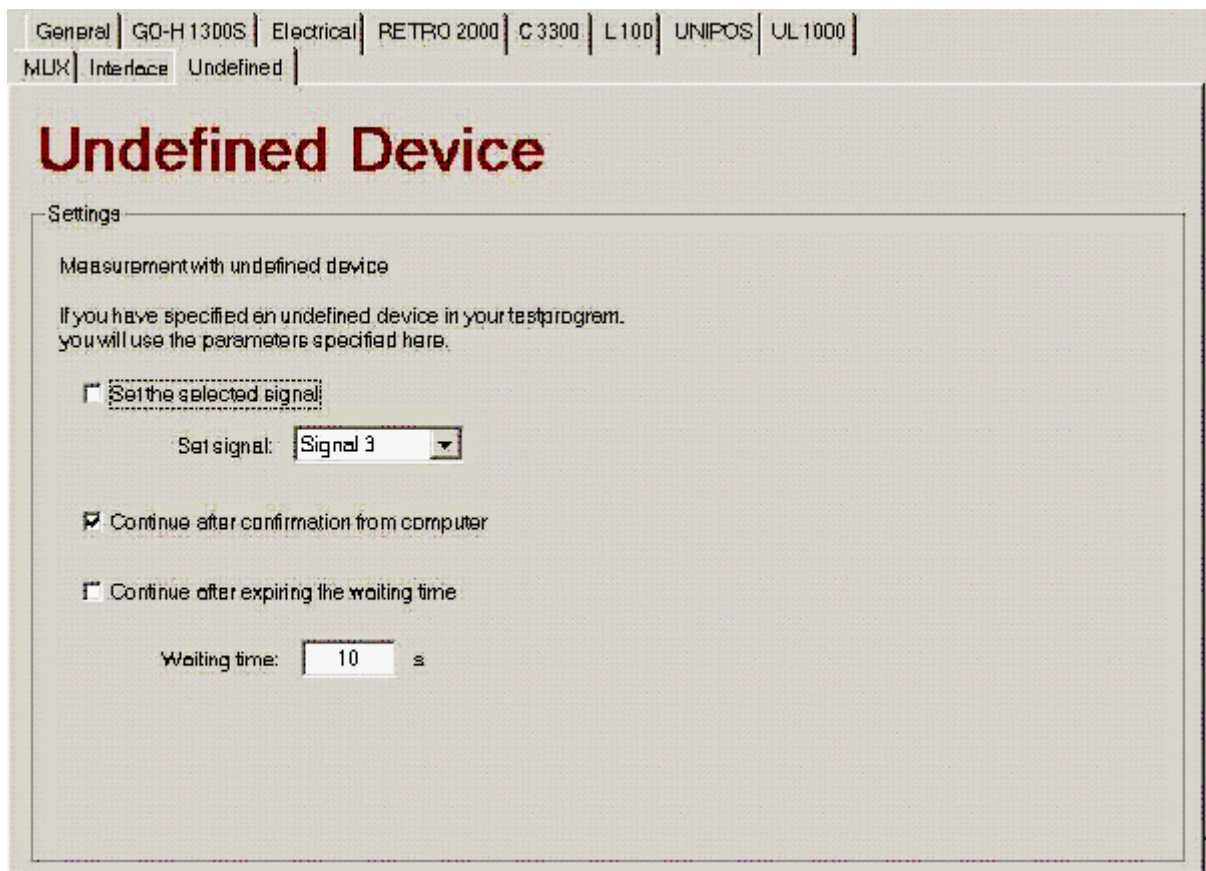
When a measurement with an undefined device is executed, the goniometer moves to the selected angular position and stops. The procedure until the goniophotometer continues with the movement or the next program function is defined by these options:

Set the selected signal: The signal selected in the set signal list is set.

Continue after confirmation from computer: Continue when a key is pressed

Continue after expiring the waiting time: If selected the program waits for the selected time given in seconds before continue. A key pressing is not necessary.

Graphic options

Graphics options: General

The graphics options window is a part of the Start options window.

The graphics options allow the setting of all parameters influencing the layout and content of a diagram displayed on the screen, printed in a report, or saved as a graphical file.

The following general conditions apply:

❑ Parameters can be set individually for each available type of diagram.

❑ Settings of all diagrams can be saved with a name as a configuration.

❑ Any number of different configurations are possible.

❑ Graphics layout can be modified individually during evaluation (the actual creation of diagrams with actual test data or calculation results)

❑ Layout of several diagrams of the same configuration set can be harmonized (using the same fonts, colors, or other styles for each of the individual diagrams

To work on a certain diagram, click on the diagrams name in the list. All activities in the other options o this window then will refer to this diagram.
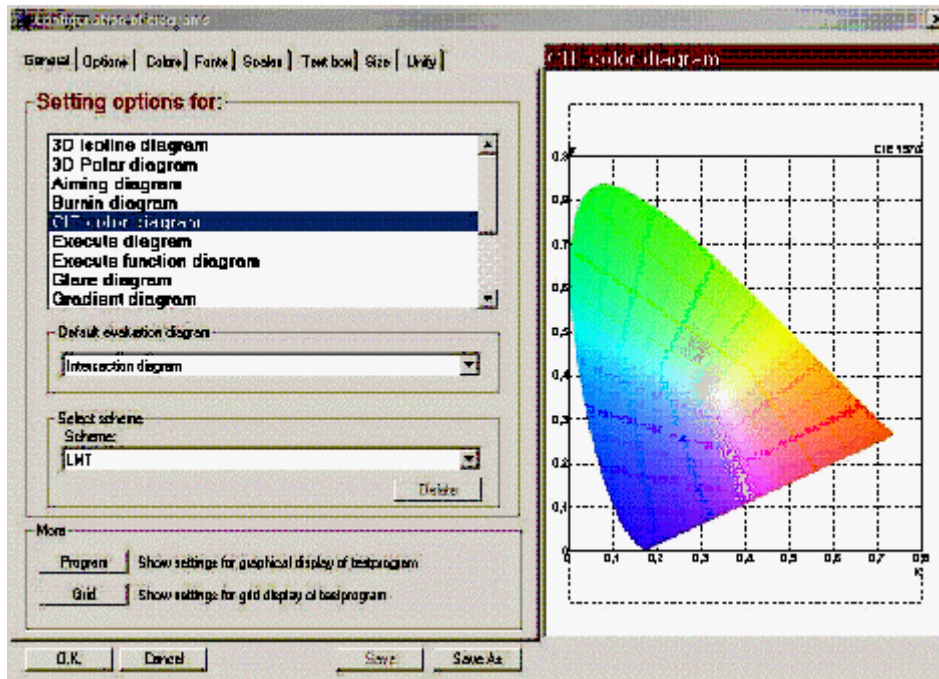
The individual groups of parameters can be modified after clicking on the tab on top of this window.

Setting options for: Select a diagram by clicking on a name of the list. A sample graphic for this type of diagram with the actual layout is shown on the right side of the window

Default evaluation diagram: Select the type of diagram preferred in the evaluation

Select scheme: Select a scheme from the available set of configurations

Delete scheme: Delete a scheme from the available set of configurations

> *Note:*
> *A scheme with the name LMT belongs to the system and cannot be deleted*

Program: Shortcut to the setting of test program display configurations

Grid: Shortcut to the setting of test program function table display configurations

O.K.: Accepts all modifications and continues with the program

Cancel: Throws away all modifications and continues with the program

Save: Saves the modified configurations under the actual name

Save As: Saves the modified configurations under new name

Options

The options window is a part of the graphics options window.

The options setting define the presentation of lines used to draw the diagram as well as objects inserted into the diagram-
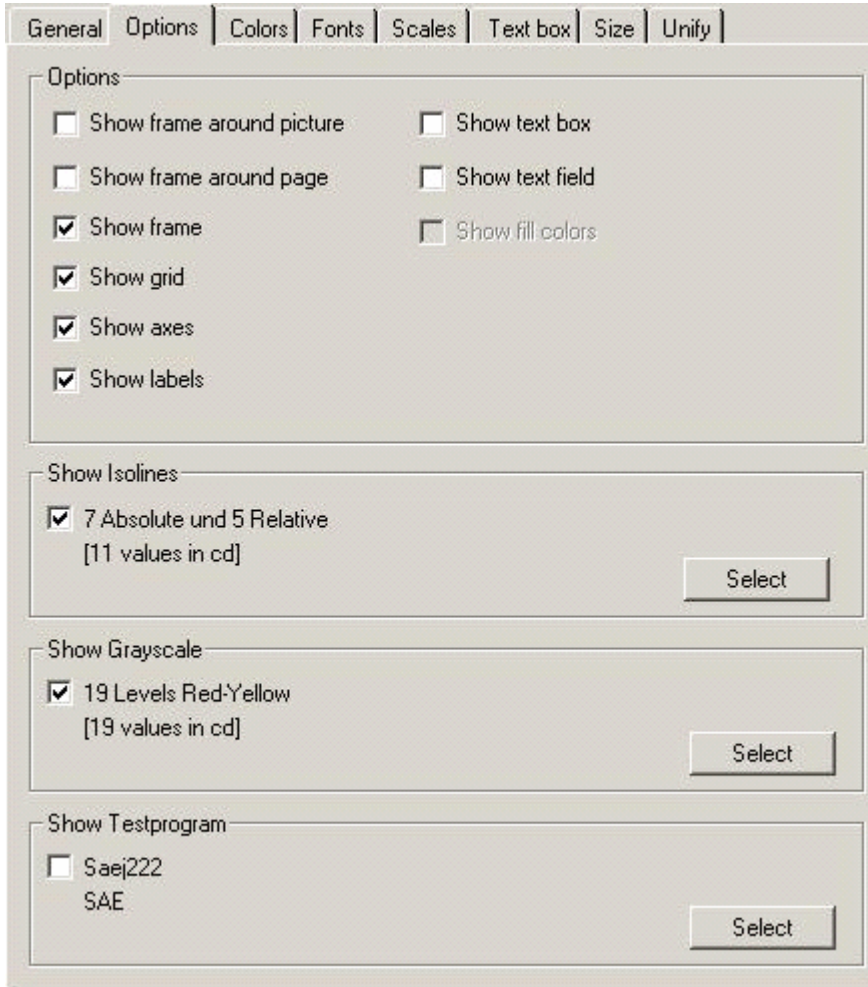
Show frame around picture: If checked a frame with the selected frame color is drawn around the whole picture

Show frame around page: If selected a frame with the selected frame color is drawn around the full page

Show frame: If checked a solid frame is drawn around the diagram in the selected style

Show grid: If checked the grid lines of the diagram are drawn in the selected style

Show axes: If checked the axes lines of the diagram are drawn in the selected style

Show labels: If checked the labels marks of the diagram are drawn in the selected style

Show text box: If checked a text box is shown in the selected style within the diagram (certain selected diagrams only)

Show text field: If checked a text field with the description of the test sample is shown in the selected style within the diagram (applies only to certain diagrams)

Show fill color: If checked areas draw within the diagram are displayed filled with a certain fill color.

Show iso-lines: If checked the iso-lines defined by the iso-system with the name displayed behind the check box are displayed. The number of lines in this iso-system are displayed additionally for your information

Show gray scale: If checked the areas of a certain level defined by the iso-system with the name displayed behind the check box is displayed in a selected color as defined by the iso-system. The number of lines in this iso-system are displayed additionally for your information

Show test program: If checked the functions of a test program with the name displayed behind the check box are displayed within the diagram. The program library is displayed additionally for your information

> *Note:*
> *The last three items (Show iso-lines, gray scale and test program) naturally are only visible and can be selected, if the selected diagram in the general section allows this feature. E.g. an intersection diagram cannot contain iso-lines.*

Select: Click here to select or modify the corresponding items

Colors

The colors window is a part of the graphics options window.

The colors settings define the colors of lines and background with which the diagrams are drawn.
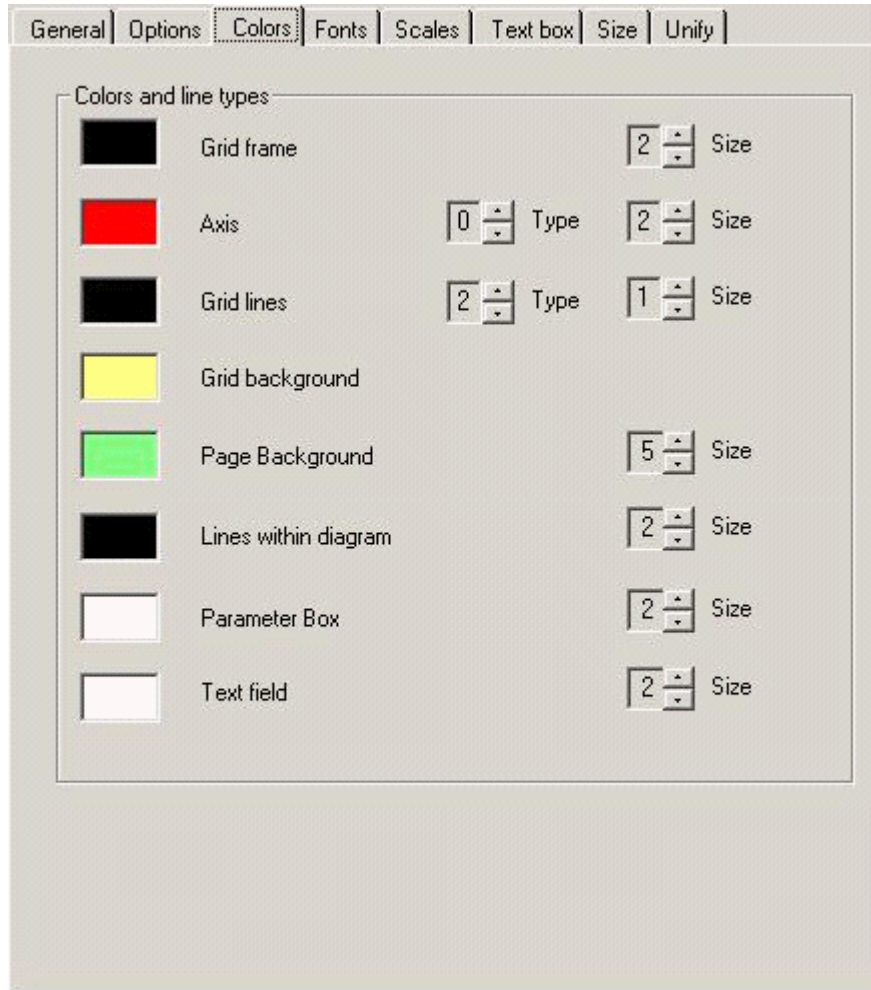
To change a color click on the colored rectangle on the left side of the description.

Grid frame: Color of the frame around the diagram

Axis: Color of the diagrams axes

Grid lines: Color of the diagrams grid lines

Grid background: Color of the diagrams background

Page background: Color of the page background (the area outside of the diagram

Lines within diagram: Color of the diagrams single lines (applies only to certain diagrams)

Parameter box: Background color of the diagrams text box (if any)

Text field: Background color of the diagrams text field (if any)

Size: The width of lines in pixels

Type: The style of lines. An integer value describes the way a line is drawn:

Setting	Description
0	Solid
1	Dash

448

2	Dot
3	Dash-Dot
4	Dash-Dot-Dot
5	Transparent
6	Inside Solid

Fonts

The fonts window is a part of the graphics options window.

The fonts setting allow to select the properties of any text displayed in a diagram
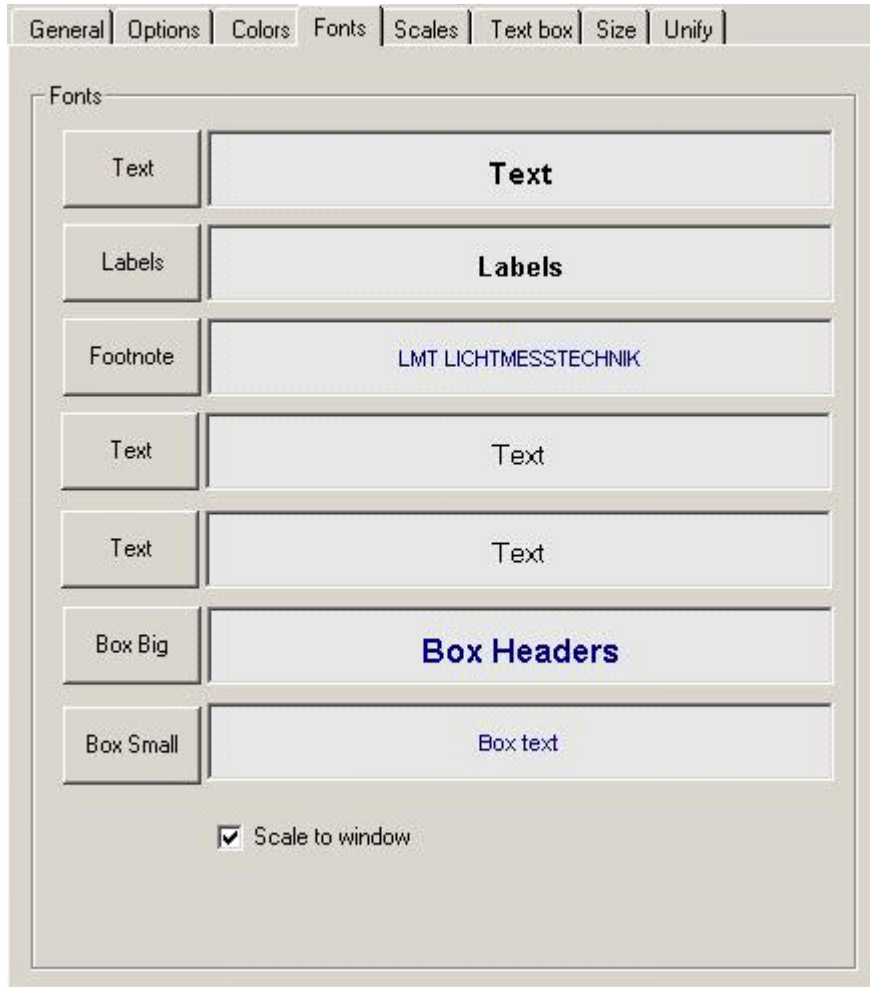
To **select** any setting click on the button on the left side of the window. After modification of fonts the example text is displayed in the rectangular field besides the button in the selected way.

Scale to window: If checked, the text in a diagram on any window on the computer screen is scaled (zoomed, resized). The larger the diagram window is, the larger appears the text. The font size selected in the Windows font selector is used as a relative measure.

Scales

The scales window is a part of the graphics options window.

The scale window allows the setting of diagram scales as well as the definition of the axes labeling of the diagram.

Horizontal axis: Definition of the horizontal axis of a diagram. The settings are used if Automatic is switched off.

x-min: The left end of the horizontal axis

x-max: The right end of the horizontal axis

x-tic: The steps of the vertical grid lines of the diagram

x-step: The steps of the text labels at the vertical grid lines of the diagram

Automatic: If checked the diagram is scaled automatic to the data range displayed in the diagram. Tics and steps are calculated for best fit of the diagram.

Left: The text label printed on the lower left corner of the diagram

Right: The text label printed on the lower right corner of the diagram

Left (second option): The text label printed on the lower left corner of the diagram

Right (second option): The text label printed on the lower right corner of the diagram

Vertical axis: Definition of the vertical axis of a diagram. The settings are used if Automatic is switched off.

y-min: The left end of the vertical axis

y-max: The right end of the vertical axis

y-tic: The steps of the horizontal grid lines of the diagram

y-step: The steps of the text labels at the horizontal grid lines of the diagram

Automatic: If checked the diagram is scaled automatic to the data range displayed in the diagram. Tics and steps are calculated for best fit of the diagram.

Left: The text label printed on the upper left corner of the diagram

Right: The text label printed on the upper right corner of the diagram

Left (second option): The text label printed on the upper left corner of the diagram

Right (second option): The text label printed on the upper right corner of the diagram

> *Note:*
> *The second option in a diagram is used, if the type of diagram allows the data to be displayed in different units (e.g. lux or candela)*

Load text from items database: Loads the default diagram text from the items database into the text fields in this window

Save text to items database: Saves the diagram text entered into the text fields in this window into the items database

> *Note:*
> *Labels text for a diagram is hold in 2 different places. The default text is within the items database, where it appears for any of the available languages. Another text is hold in the graphics options database. Usually the text entered here is used for the diagrams. The items database text can be used, if the diagrams shall be printed or displayed in a language different from the operations language*

Text box

The text box window is a part of the graphics options window.

The text box parameters define size and location of text boxes and text fields which shall be displayed in a window additionally to a diagram.

Text boxes are located anywhere on the window. Their content depends on the individual diagram type. Only certain diagrams can contain text boxes.

Text fields are located either on top or on the bottom of a diagram window. They contain typically the text sample data, if the diagram is used for test sample data evaluation

Text field portrait/landscape are used for diagrams when send to a printing device. They can appear at a different location and style if the paper orientation on the printer is either set to portrait of landscape mode.

| General | Options | Colors | Fonts | Scales | Text box | Size | Unify |

Text box
- Left: 68
- Width: 30
- Top: 98
- Height: 25
- ☐ Show text box

Text field
- Left: 0
- Width: 100
- Top: 90
- Height: 10
- ☐ Show text field

Text field portrait
- Left: 0
- Width: 100
- Top: 85
- Height: 15
- ☐ Show text field

Text field landscape
- Left: 0
- Width: 100
- Top: 85
- Height: 15
- ☐ Show text field

Left: The left most position of a box or field within the diagram, given as a percentage value of the page width

Width: The width of a box or field, given as a percentage value of the page width

Top: The top position of a box or a field within the diagram, given as a percentage value of the page height

Height: The height of a box or field, given as a percentage value of the page height

> *Note:*
> *Some diagrams cannot change the position of text fields, they remain on the bottom.*

Size

The size window is a part of the graphics options window.

The size window allows the setting of the actual diagram grid size within the displayed window or the printed page. The additional features selectable on this window appear only, if the type of diagram selected in the general window allows it.

Borders: Borders are given in percentage of the window width or height

Maximum marking: Only possible if allowed by the diagram type

Show position of maximum: The position of the maximum is displayed in the diagram as a small cross

Label position of maximum: The position of the maximum is displayed in the diagram additionally with the wording "Maximum"

Clear background of position label: The position of the maximum is displayed in the diagram additionally with the wording "Maximum", if selected, and the background around this word is cleared from other display (lines, etc)

Raster scale

A raster scale indicates the range of colors used in a grayscale (color scale) diagram the range of values as defined by the iso-system.

Left: The scale appears vertically on the left side of the diagram

Right: The scale appears vertically on the right side of the diagram

Top: The scale appears horizontally on the top of the diagram

Bottom: The scale appears horizontally on the bottom of the diagram

Bound to grid: The scale is sized that it matches the vertical or horizontal grid size

Distance from border: The distance of the scale in percent of page height or width

Start from border: The start position of the scale in percent of page height or width if not bound to grid

End from border: The end position of the scale in percent of page height or width if not bound to grid

Width of raster scale: The width of the scale in percent of page height or width

Maximum no. of iso-values to label: Each color area in the scale is labeled with the corresponding value of the iso-system. The maximum number of labels can be entered.

> *Note:*
> *The number of values can be limited if e.g. too many labels would appear, as there can be up to 256 different values in the iso-list. If the number is limited to a value, and there are more values available, only the first and the last values are displayed*

Draw boxes around raster scale: The scale can be displayed as a box with a solid outline

Show raster scale: A scale is displayed only if this box is checked

Iso-ine scale

A iso-line scale lists all iso-values in an iso-line diagram as defined by the iso-system.

Left: The scale appears vertically on the left side of the diagram

Right: The scale appears vertically on the right side of the diagram

Top: The scale appears horizontally on the top of the diagram

Bottom: The scale appears horizontally on the bottom of the diagram

Bound to grid: The scale is sized that it matches the vertical or horizontal grid size

Start from border: The start position of the scale in percent of page height or width if not bound to grid

Show iso-line list outside diagram: A scale is displayed only if this box is checked

Show iso-line values within diagram: Each iso-line can contain labels indicating their corresponding value at a position within the line

Clear background of line labels: If line labels within the lines are enabled, they can appear transparent. If this item is checked, the background around the label is cleared from any other display

Labels in iso-color: The labels are displayed in the same color as defined for the corresponding iso-line

Labels in text-color: The labels are displayed in the same color as defined for the labels used for the diagram axes

Unify

The unify window is a part of the graphics options window.

The unify window allows to copy certain characteristics of one diagram to any other diagram, so that these diagrams appear in the same style.
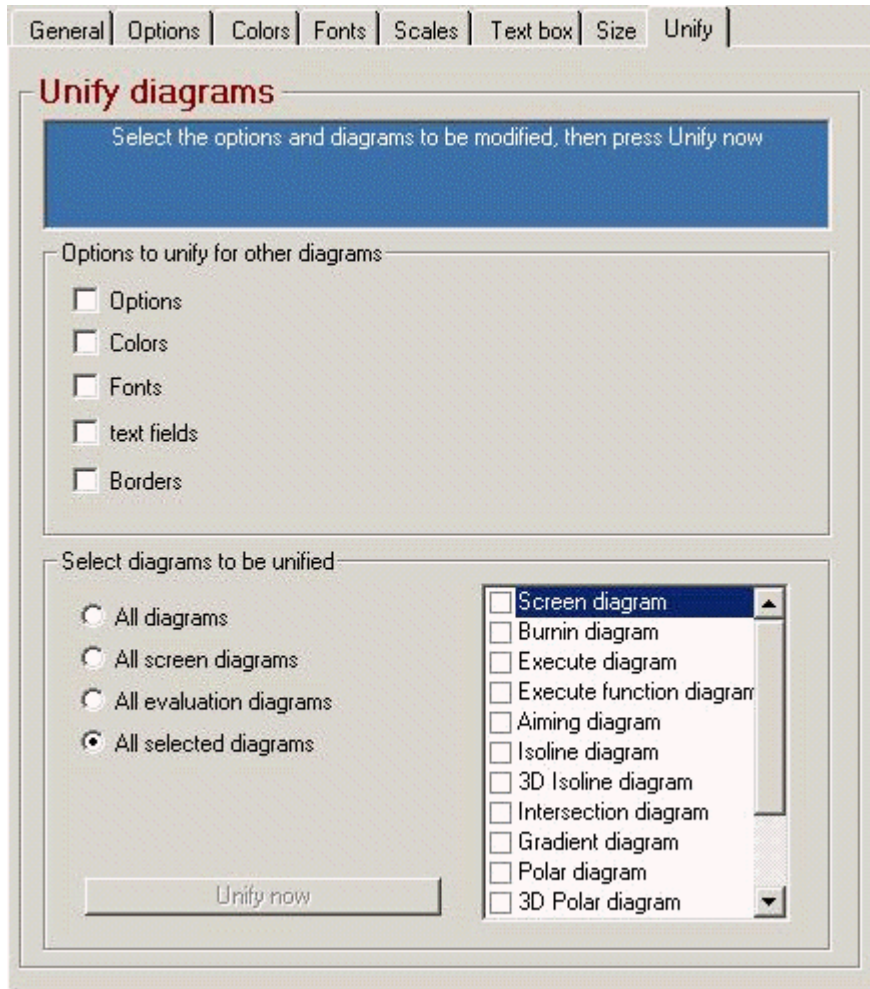
Options to unify: The options Options, colors, fonts, text fields and borders correspond to the group of settings as collected in the individual pages of the graphics options window.

Select diagrams to unify: The unifying of diagrams can be applied to all other diagrams, all screen diagrams (diagrams which are not valid for data evaluation), all evaluation diagrams, or all selected diagrams in the list on the right side. To select a diagram click on the check box beside the name in the diagrams list.

Unify now: After selecting at least one option and one diagram this button performs the unifying.

Files and folders

Files and Folders: General

The files and folders window is a part of the Start options window.

The files and folders options allow the definition of default files or folders used in the LMT LIMES 2000 program execution

Note:
Principally all files required from and all files created by LIMES 2000 can be at any location on any medium accessible from the computer on which Limes is running. It is strongly recommended, to organize Limes in a way that any file can easily be found. As an example all database files are located per default in a sub-folder (or sub-directory) within the folder on which Limes is installed.

The LIMES 2000 setup automatically creates the following file system:

- *On the hard disk containing the Windows system*
  - *Folder Program Files (Windows default folder)*
    - *Folder LMT*
      - *Folder Limes 2000*
      - *Limes.exe and other DLLs and system files*
      - *…*
        - *Folder Data*
          - *Database files (.mdb)*
          - *Configuration files (.ini)*
          - *…*

Whenever Limes is started and a file is accessed the first time, Limes uses the folder specified in this window.
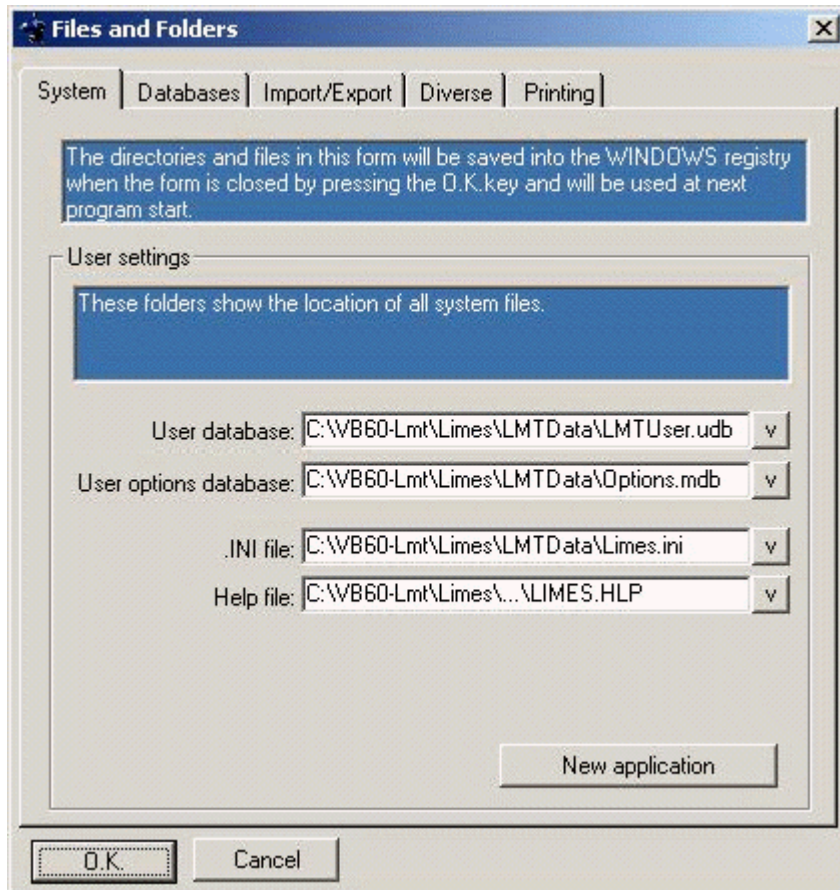
User database: The special user database file (extension .udb) containing special setup information. This database cannot be edited from the user with MS ACCESS

User options database: Contains all configurations

INI file: Contains the hardware settings

Help file: Contains the LMT LIMES 2000 Windows on-line help

New application: Creates a new application

O.K.: Accepts and continues. Modifications are automatically saved to the Windows registry

Databases

The databases window is a part of the Folders: General window

The databases window allows the setting of all locations and names of databases used by the LMT LIMES 2000 program.
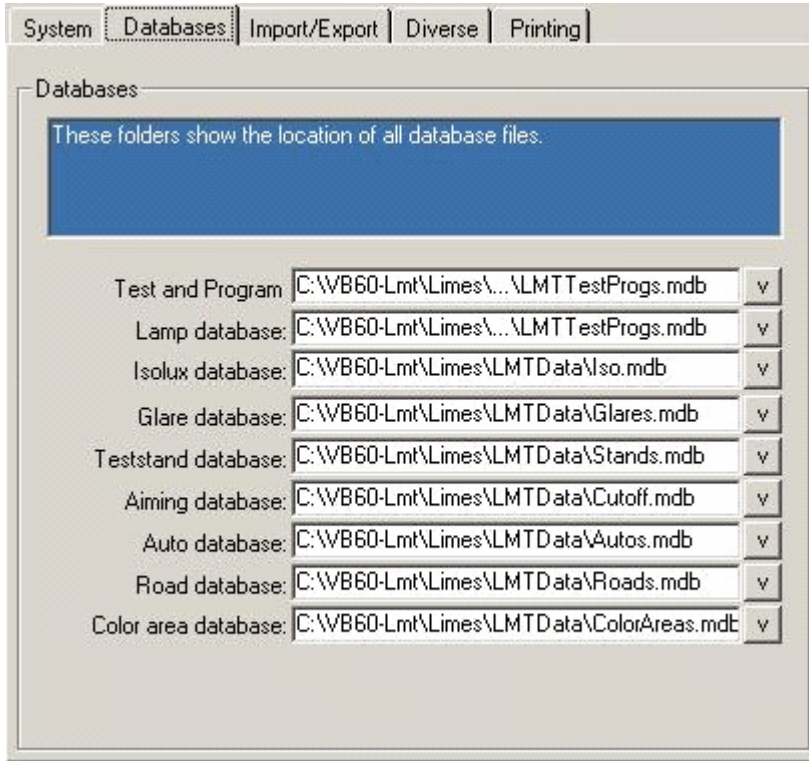
To **select** another database click on the button on the right side of the name

To **see** the full path and file name move the mouse across the name

When a new database is selected, Limes automatically checks whether the new database contains proper values. If not a message is displayed.
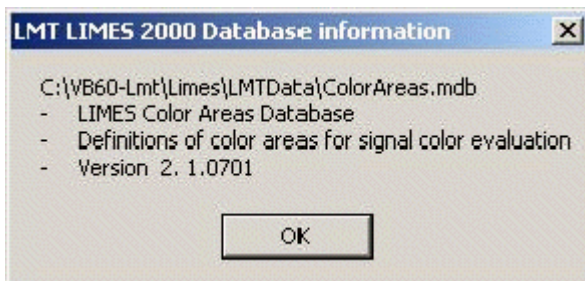
After this the user has to select another database file.

If the user enters a name for a database which does not exist in this location, no message is displayed until the files and folders options window is closed. Then a missing database message appears:
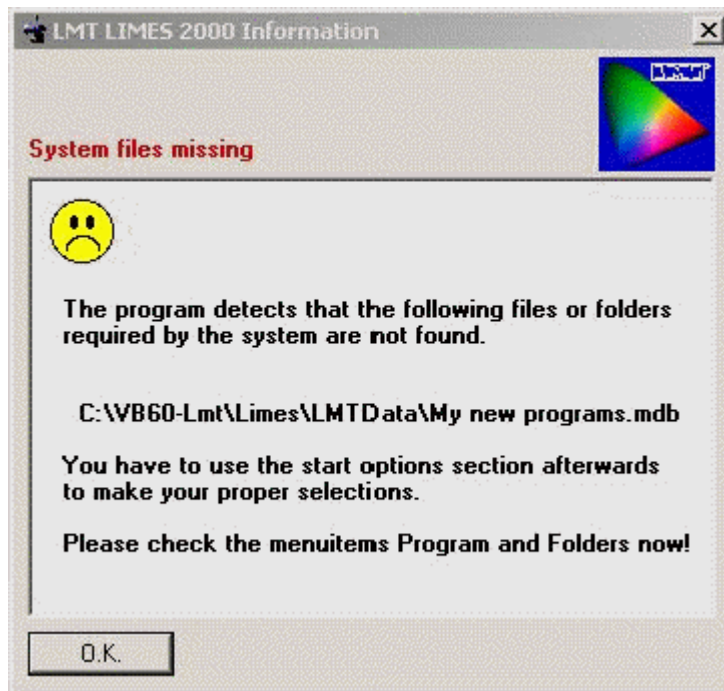
It is recommended to go back to the files and folder window and select a proper database, other wise this message will be displayed again in the future.

> *Note:*
> *You can create new databases if you ignore the message and continue. The go to the part of the program (e.g. database main menu) and select the corresponding function and follow the dialogs.*

Import/Export

The import/export window is a part of the Folders: General window

The import/export window allows the setting of all locations of folders, where the Limes program searches initially if the user imports or exports general ASCII data files.
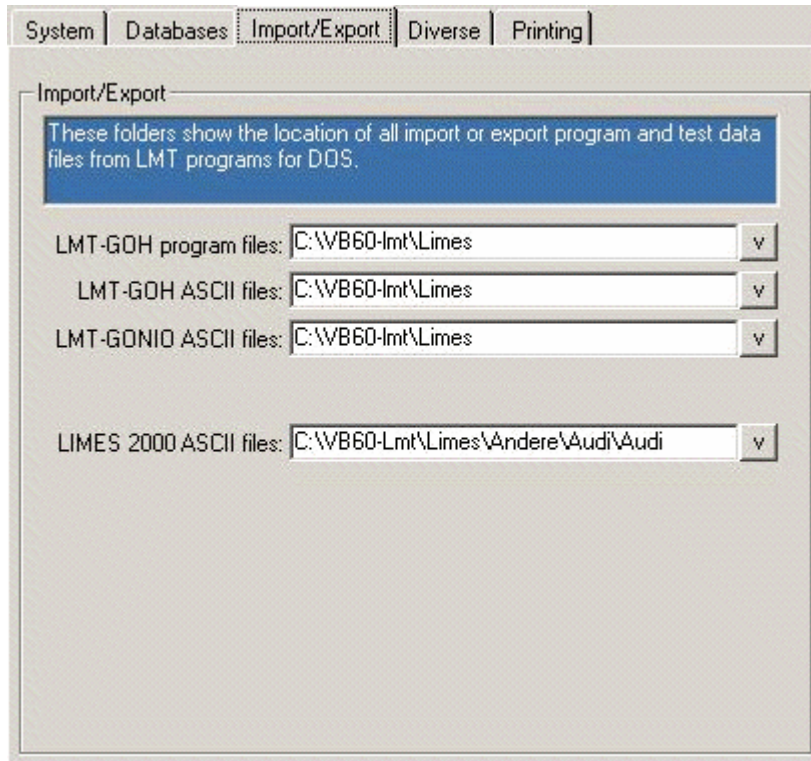
To **select** another folder click on the button on the right side of the name

To **see** the full path move the mouse across the name

> *Note:*
> *Only a path name is required. Any selected file name located in this path is meaningless.*

Diverse

The diverse window is a part of the Folders: General window

The diverse window allows the setting of all locations of folders and files for miscellaneous purpose.
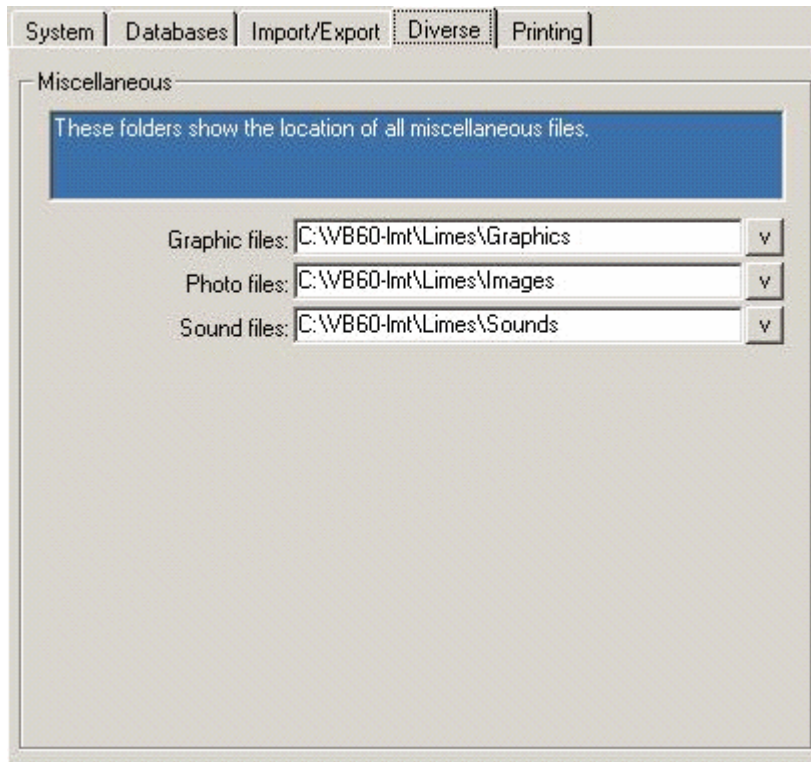
To **select** another folder click on the button on the right side of the name

To **see** the full path move the mouse across the name

Graphic files: Folder where Limes initially searches for graphics (bitmap) files

Photo files: Folder where Limes initially searches for photo (bitmap) files

Sound files: Folder where Limes initially searches for sound (wave) files (extension .wav)

Folders: Printing

The printing window is a part of the Folders: General window

The printing window allows the setting of all locations of the folders and files for printing the header or footer text on a test report (protocol)
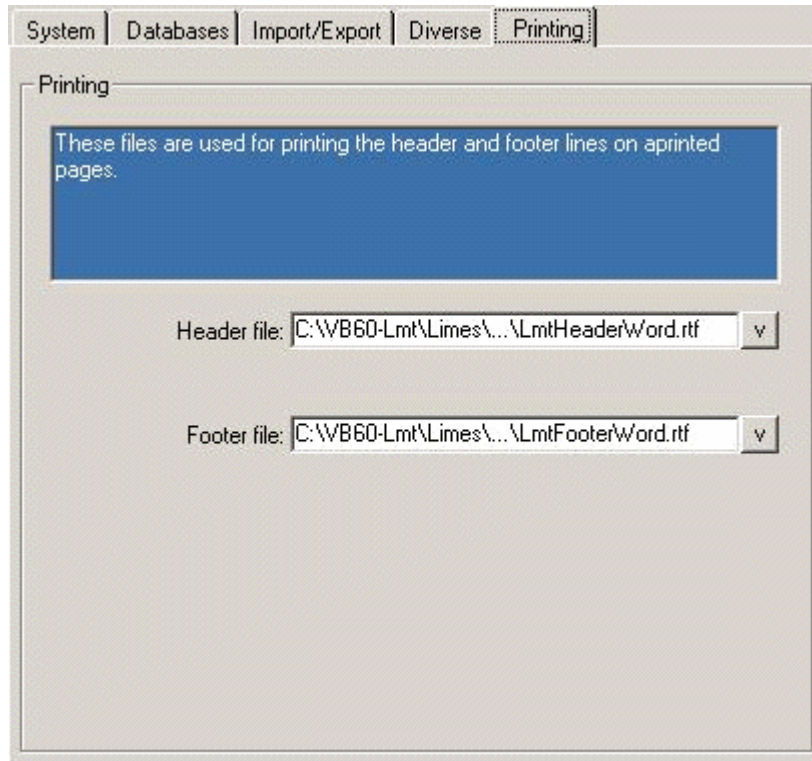
To **select** another folder click on the button on the right side of the name

To **see** the full path move the mouse across the name

Extras

Page setup

The page setup window can be accessed from the printer setup window.

The page setup allows a creation of several standard page formats which can be saved with a name into a database.

Each page can have its individual orientation, margins, headers, footers, and logos or bitmaps at any location.

Select scheme

A pre-defined page can be received from the database. A page can be created or modified, saved with the same or a new name, or deleted.

Save: Save the page with the same name

Save As: Save the page with the new name

Delete: Delete the page

O.K.: Accept and terminate.

Cancel: Do not accept and terminate

Page size: The picture shows a layout of a selected page. The upper area on top is the header area (marked red), the lower area at the bottom the footer area (marked green). The printable area between the left and right margins is shown in yellow color. Any bitmapped assigned to the page is displayed (the LMT symbol as an example).

Format portrait/landscape: Select the page orientation

Dimensions: Enter page dimensions either in cm or inch

Margins: Enter the margins in the selected unit

Header file: Select a valid header file (extension .rtf) to be displayed on top of the page by clicking on the select button

Header: Print the content of the header file as header on each page

Header Top: Distance between header text and top margin

Footer file: Select a valid footer file (extension .rtf) to be displayed on top of the page by clicking on the select button

Footer: Print the content of the footer file as footer on each page

Footer Top: Distance between footer text and bottom margin

Extras

This item is an menu item of the Limes Main Menu.

In this menu several special functions are available, which are not directly related to the measurement and evaluation process.

Color Calculator
Translate
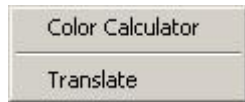
▢ Color calculator

▢ Translator

Color calculator

This item is a sub-menu of the Limes Extras menu

The color calculator allows some basic color calculations:

- ❑ Transformation x,y into u',v'
- ❑ Dominant wavelength and saturation
- ❑ Correlated color temperature
- ❑ Color differences in CIELUV and CIELAB

Input

x, y: Enter CIE chromaticity coordinates you want to transform

Y: Enter

Reference: Enter the reference illuminant

Others: If checked, you can enter any illuminant by x_{ref}, y_{ref}, Y_{ref}

Calculate: Click on this button to perform the calculation

Output

u',v': CIE chromaticity coordinates in CIE-UV diagram 1960

L,u,v: CIELUV coordinates

L,a,b: CIELAB coordinates

Wavelength: Dominant wavelength

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Saturation: Saturation

Tc (approx.): Correlated color temperature calculated by a simplified method

Tc (excact): Correlated color temperature calculated by an exact method

O.K.: Terminate this window

Help

Help menu

This item is a menu item of the Limes Main Menu. Any sub-menu in this menu displays special information about the hardware and software and shows the LMT LIMES 2000 on-line help.

The help menu has the following entries:

This menu invokes the display of the list of content of the full LIMES 2000 documentation

This menu shows the LIMES splash screen

This menu displays the actual version and revision number of the running LIMES software

This menu displays the user information about licenses, functions, databases, etc.

This menu displays the list of available hardware, and has additional information about special DLL-files (Dynamic Link Libraries), which contain compiled functions of the LIMES software

LMT LIMES 2000 Help

The LMT LIMES 2000 on-line help can be displayed during program execution as

- ❑ Context sensitive help: by pressing the key F1 during program execution
- ❑ From the Limes main menu item Help, sub-menu Help
- ❑ By double clicking on the file Limes.hlp in the Windows explorer

The LIMES Help contains all information which is available in this documentation. The help files are usually available in the LIMES 2000\Help folder.

About Limes 2000

The about window can be displayed by selecting About from the Help menu of the Limes Main Menu.

This window shows information about LMT LIMES 2000 as it automatically appears at Limes program start.

Clicking on the LMT symbol on the top left corner displays LMT address and communication information.

Version information

The version window can be displayed by selecting Version from the Help menu of the Limes Main Menu.

This window shows information about the LMT LIMES 2000 Version

User information

The user info window can be displayed by selecting User info from the Help menu of the Limes Main Menu.

This window shows information about the actual user of the LMT LIMES 2000 software
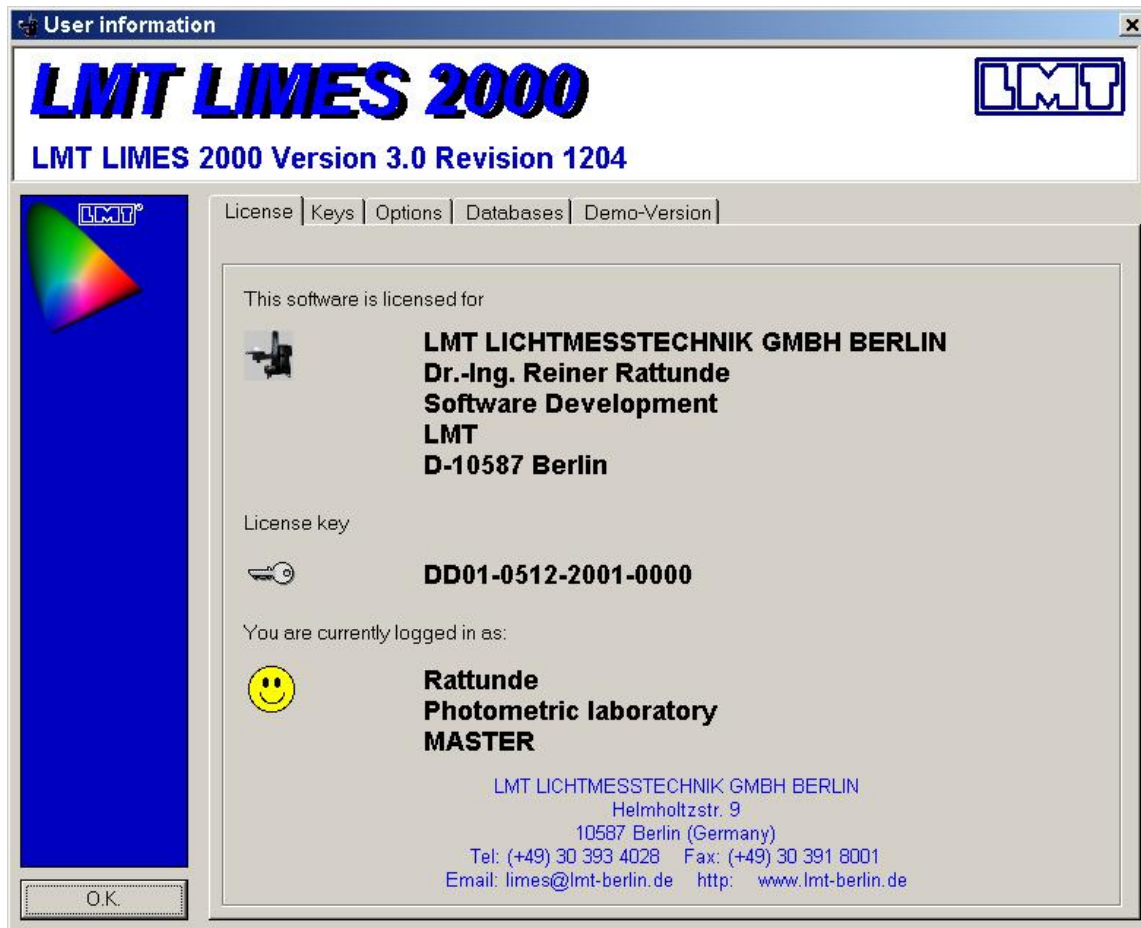
License

This window shows the user license of the LIMES software, the license number as given by the hardlock, and the currently logged user.
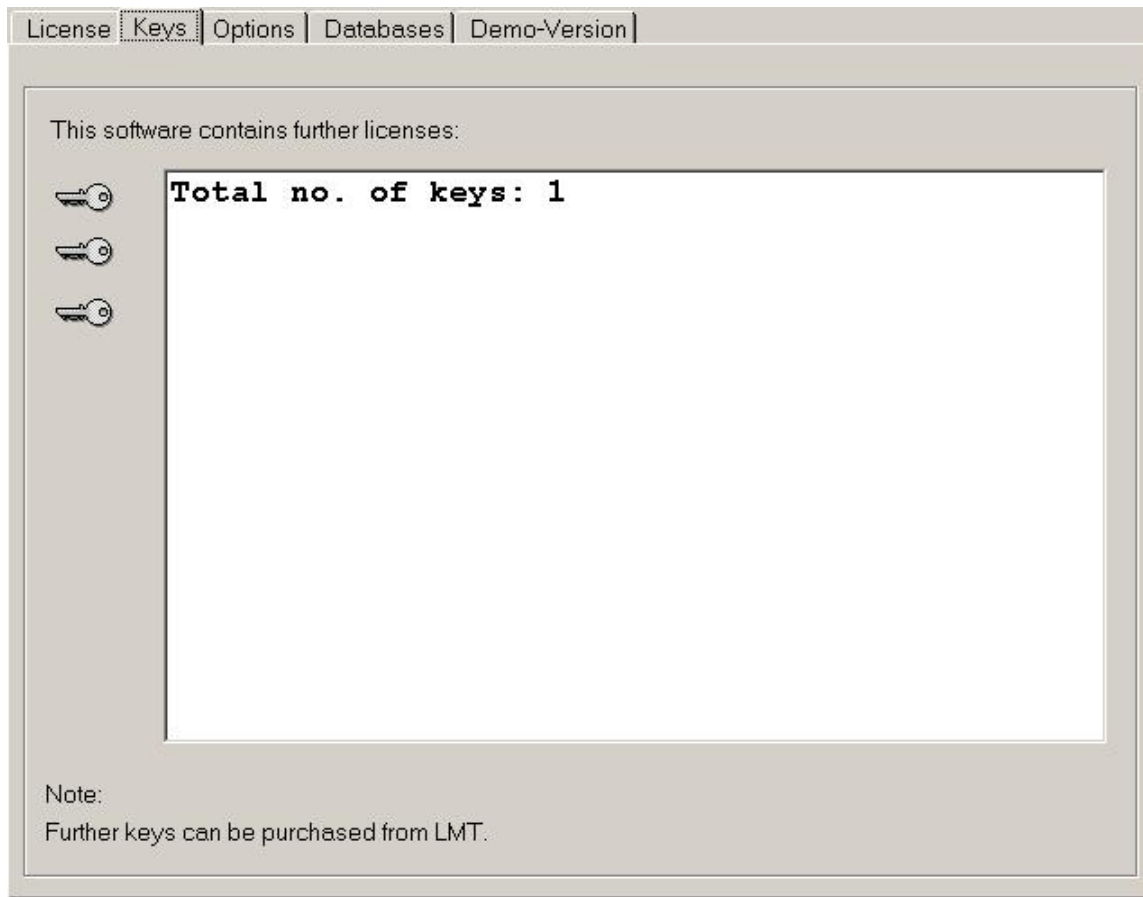
Keys

This window lists other supported hardlocks (licenses) which can be connected to the PC and allow the LIMES software to be executed

License | Keys | Options | Databases | Demo-Version |

This software supports the following options:

✓

```
Supported Devices:
    Goniophotometer GO-H 1300S
    Goniophotometer GO-H 1300
    Goniophotometer GO-H 1200
    Goniophotometer GO-H 800
    Goniophotometer GO-H 500
    Goniophotometer GO-DS 1600
    Goniophotometer GO-DS 2000
    Goniophotometer GO-V 1900
    Flux Integrator GO-FI 2000
    4-Axes Goniometer GO-QX 1000
    Goniophotometer GO-V 1900 (1988)
    Goniophotometer GO-V 1900 (1984)
    Tele-Control for GO-H
    Tele-Control for GO-DS
```

Note:
Further upgrades can be purchased from LMT.

Options
The options window shows the list of supported devices, functions, and other items available in the system
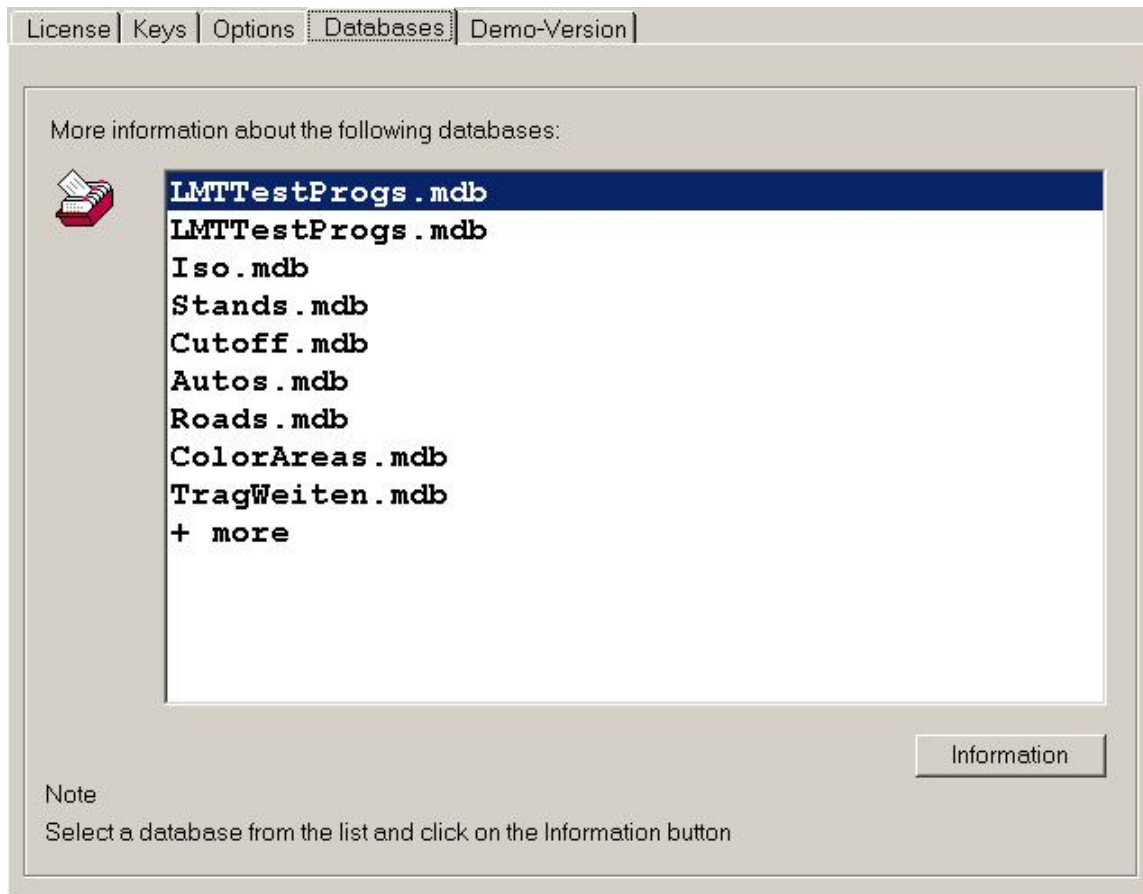
Databases

This window shows a list of the default databases used by this version of the LIMES software. To get more information about the structure of the databases, select a database from the list, and click on the Information button.
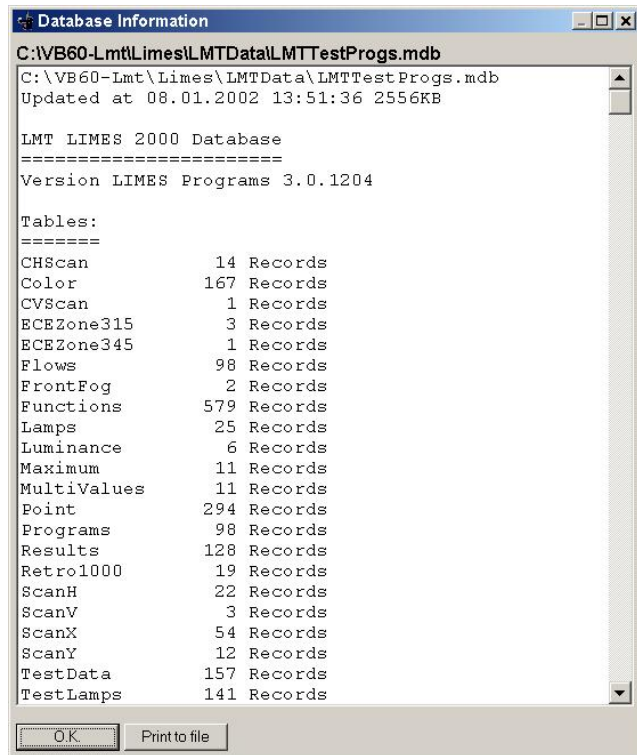
Database information

This window displays the general content version and tables of the selected database. The number of records indicates how much data has been saved for this table

Demo-version

This window is available only if a demo-version has been installed, and the hardlock attached is a special demo-hardlock provided by LMT for trial.

Hardware information

The hardware info window can be displayed by selecting Hardware info from the Help menu of the Limes Main Menu.

This window shows information about the actual user of the hardware connected or installed with the LMT LIMES 2000 software as well as information about the version of the main Limes dynamic link library (DLL).

Note:
Active devices are shown in normal mode. Inactive but available devices are shown with in arrow in front of the device description. These devices can be activated in the LIMES hardware options

Click on the **software** button to display the DLL version information
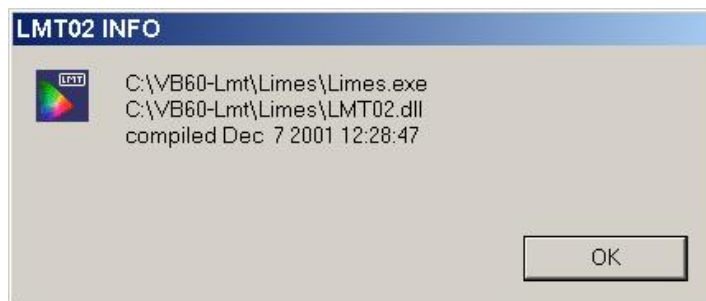
Appendix

Sort items
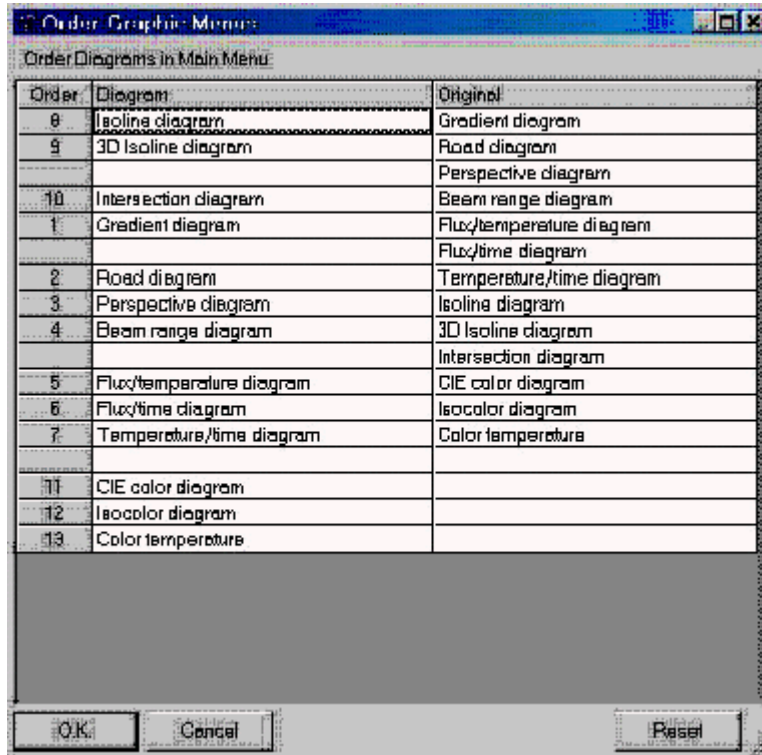
Rearranging items

You may rearrange the display order of several items, such as graphic or table menus, program functions or report lists.

> ❑ Click with the left mouse onto an item in the left item list and hold the mouse button down.
>
> ❑ Drag the item to the position within the left item list you want.
>
> ❑ Release the left mouse key.

Inserting blank lines

In the menu lists you can insert dividing lines, which appear as blank lines in the left item list.

> ❑ Click on the row of the left item list, where you want to insert the blank line.
>
> ❑ Press the Insert key

Deleting blank lines

You can delete any blank line, but no item line.

> ❑ Click on the blank line in the left item list.
>
> ❑ Press the delete key.

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Hiding items

You can hide an item of the menu list.

- ❑ Click with the left mouse onto an item in the left item list and hold the mouse button down.
- ❑ Drag the item into any position in the right item list
- ❑ Release the left mouse key

The item disappears from the left item list, and the corresponding item in the right list appears with a yellowish back color

To make a hidden line visible again, click onto the yellow marked item in the right list and drag it into an empty position in the left item list. From this position you can drag it into any other position of the left item list.

> *Note:*
> *You can only hide graphic or table menus and program functions for printing.*

Reset

To get the original order, click on the Reset button.

O.K.

You accept the new order and return back to the program. Your modifications are automatically saved into the Windows registry.

Cancel

You throw away your modifications and return back to the program.

Full path

A full path is a valid path in a Windows file system. consisting of the path and the file name, e.g.

  C:\Program files\LMT\LIMES 2000\Data\Limes.ini

or

  \\MYCOMPUTER\\DriveC\Program files\LMT\LIMES 2000\Data\Limes.ini

A full path may be to long to be displayed in a text field and therefore shorted. The full path is visible as a so-called tool tip text when the mouse pointer is moved across the field.

Select button

Click on this button with the left mouse to allow a selection from a list

Hot spots

This image contains so-called hot spots, which helps you to find the related information easier.

If you move the mouse cursor across the image and pass a hot spot, the mouse cursor changes into the figure of a hand. If you click with the left mouse key at this point, the information provided in this help file for the item of the image displayed at the hot spot is immediately displayed

To return to the help image click on the Return button in the Windows help button bar on top of the help window.

Open project

This item can be selected from the Limes main simulation menu. It allows you to open an existing road lighting calculation project.

Isoroad assistent

LimesControl Reference

LimesControl Menu

Main window

The LimesControl program main window is displayed when the LimesControl.exe is started.

Main window example for automotive lighting

Main window example for general lighting with Goniophotometer GO-DS 2000

Main window example for general lighting with Goniophotometer GO-V 1900

GO-H 1300S / GO-DS 2000: The blue title bar indicates the name of the LMT photometric system

Icon: The goniometer icon indicates that the hardware is connected to the computers interface. A missing icon indicates that the hardware is not connected

> *Note:*
> *If the hardware is not connected, the system runs in the so-called simulation mode. As no hardware is available, all hardware functions such as moving a goniometer , reading a photometer value, or controlling any instrument is simulated by arbitrary, computer generated values.*

Photometer-Unit: The image of the selected photometer-unit of an LMT goniophotometer system.
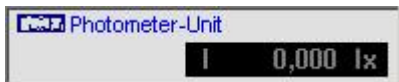
Goniometer-Unit: The image of the selected goniometer-unit of an LMT goniophotometer system.

Control-Unit: The image of the selected control-unit of an LMT goniophotometer system.

UL 1000: The image of the selected luminous flux measurement display unit

C 1210: The image of the selected colorimeter

RETRO 1000: The image of the selected retro-reflex measurement RETRO 1000 system

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RETRO 2000: The image of the selected retro-reflex measurement RETRO 2000 system

L 1009: The image of the selected luminance measurement device with an ISEL XZ-unit

MUX: The image of the selected photometer multiplexer unit
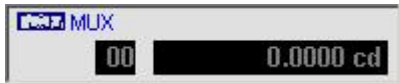
HP 6038A: The image of the selected power supply unit.

The circles indicate the lamps (lamp one at the left, lamp two at the right) which turn yellow when the lamp is burning

TeleControl: The image of the selected TeleControl.

Connected: The status bar shows the connection to the host computer which runs the Limes program

Not Connected: The status bar shows no connection to the host computer which runs the Limes program
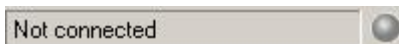
> *Note:*
> *The images displayed match the settings in the hardware options of the LMT Limes program.*
> *Only available and active instruments appear in this window.*
> *If an instrument is available and connected to the system but not displayed here, check the*
> *settings in LMT Limes program by using the main menu item options/hardware.*

Per default no menu bar is shown. To control the functions of the LimesControl program, click anywhere within the displayed main window with the right mouse button to get a pull down menu.

If you do this after program start for the first time, you have to login into the program. Enter your valid password and confirm with O.K. After login you can repeat the first step with clicking anywhere within the displayed main window with the right mouse button to get a pull down menu until you logout again.

Pull down menu

The pull down menu of the LimesControl program is opened by clicking anywhere within the displayed main window with the right mouse button.

> *Note:*
> *You have to login the LimesControl program if you do this for the first time after program start.*

Resize ▶
Menu bar
Start
✔ Stop
Control
Power supply
Hardware test
Language
Options
Initialize
Show devices
Help
License info
About
Login
Disconnect
Exit

Menu bar

This menu item allows the display of the main menu bar on top of the main window.

The main menu contains the same items as the pull down menu, with identical functions.

To hide the main menu bar select either the items options/menu bar from the menu or the item menu bar from the pull down menu.

Resize

This menu item allows the resizing of the main window display. The default setting is 100%. By resizing the window can be enlarged up to almost full screen size.

Size and position of the window are saved into the Windows registry after terminating the LimesControl program.

Start

This menu item invokes reading of the instruments shown in the main window. The readings take place in cycles of about 1 reading every second.

When an instrument is read, the display is updated in the main window. This is indicated as all updated figures appear in red color.

If no reading occurs, after a certain time (ab. 2s) the display of the figures in the main window turns into gray color.

Stop

After invoking the reading in cycles every second, this reading can be stopped by using the Stop menu.

If no reading occurs, after a certain time (ab. 2s) the display of the figures in the main window turns into gray color.

Control

This main menu item is only available if a goniophotometer is connected to the system.

This menu item displays a new window, where the goniometer can be moved into any possible position by using the dragging functions with the mouse.During movement the actual location and the corresponding photometric measurement value is displayed.

Control goniometer GO-H

Power supply

This main menu item is only available if a power supply is connected to the system.

This displays a new window, where the connected power supplies can be controlled manually. The control can be performed by entering voltages and currents, or by dragging a control slider.

Hardware test

This menu item allows the testing of various functions of the communication between PC and the connected hardware.

> *Note:*
> *It is recommended strongly that this function is used in the following conditions:*

- *New instruments have been connected to the system*

- *The configuration of an instrument was changed*

- *Any communication problems appear during normal operation in a test program*

General hardware test

Language

This menu item allows the setting of the operation language of the LimesControl program.

Usually the setting is taken from the setting of the LMT LIMES 2000 configuration defined by the Limes program. If LimesControl is installed on a different computer, or the LimesControl has no access to these settings on any other reasons, the language can be changed here.

Options

This menu item is only visible if the user is logged in as superuser or master.

This menu item allows the setting of various options of the LimesControl program.

Usually the setting is taken from the setting of the LMT LIMES 2000 configuration defined by the Limes program. If LimesControl is installed on a different computer, or the LimesControl has no access to these settings on any other reasons, the options can be changed here.

Initialize

This menu reads the options settings from the options databases or the configuration files. If modifications are made to settings in the Limes program, which influence the LimesControl program such as hardware settings, the LimesControl program must be initialized, until this changes become effective in the program.

Show devices

This menu item displays a window showing the basic hardware configuration.

After selecting an instrument from the list of available devices, the related information is displayed in the fields below
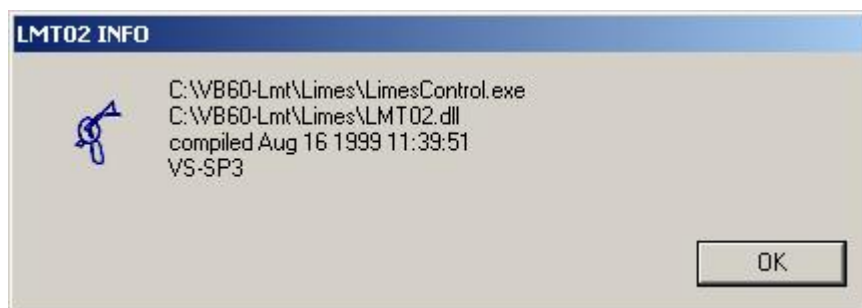
After clicking on the software button, the version and the release information of the LMT LIMES 2000 dynamic link libraries (DLLs) is displayed.

Help

This menu item invokes the online help function of LMT LIMES 2000 program system.

License info

This menu items displays a window showing the available user licenses of the LMT LIMES 2000 software.

About

This menu item shows a splash screen with the general information about LimesControl program version and release.

After clicking the System info button, the information about the computer, operation system and settings are displayed.

> *Note:*
> *This function is totally controlled by Windows. Results displayed are different depending on the operating system.*

Control goniometer

Move Goniometer

Control goniometer (GO-H)

This describes the functions of Control goniometer for a goniophotometer with horizontal mounting table, like LMT GO-H 1300, GO-H 800, etc.

The solution of angular values and the angular ranges depend on the available goniometer type.

The following window appears:
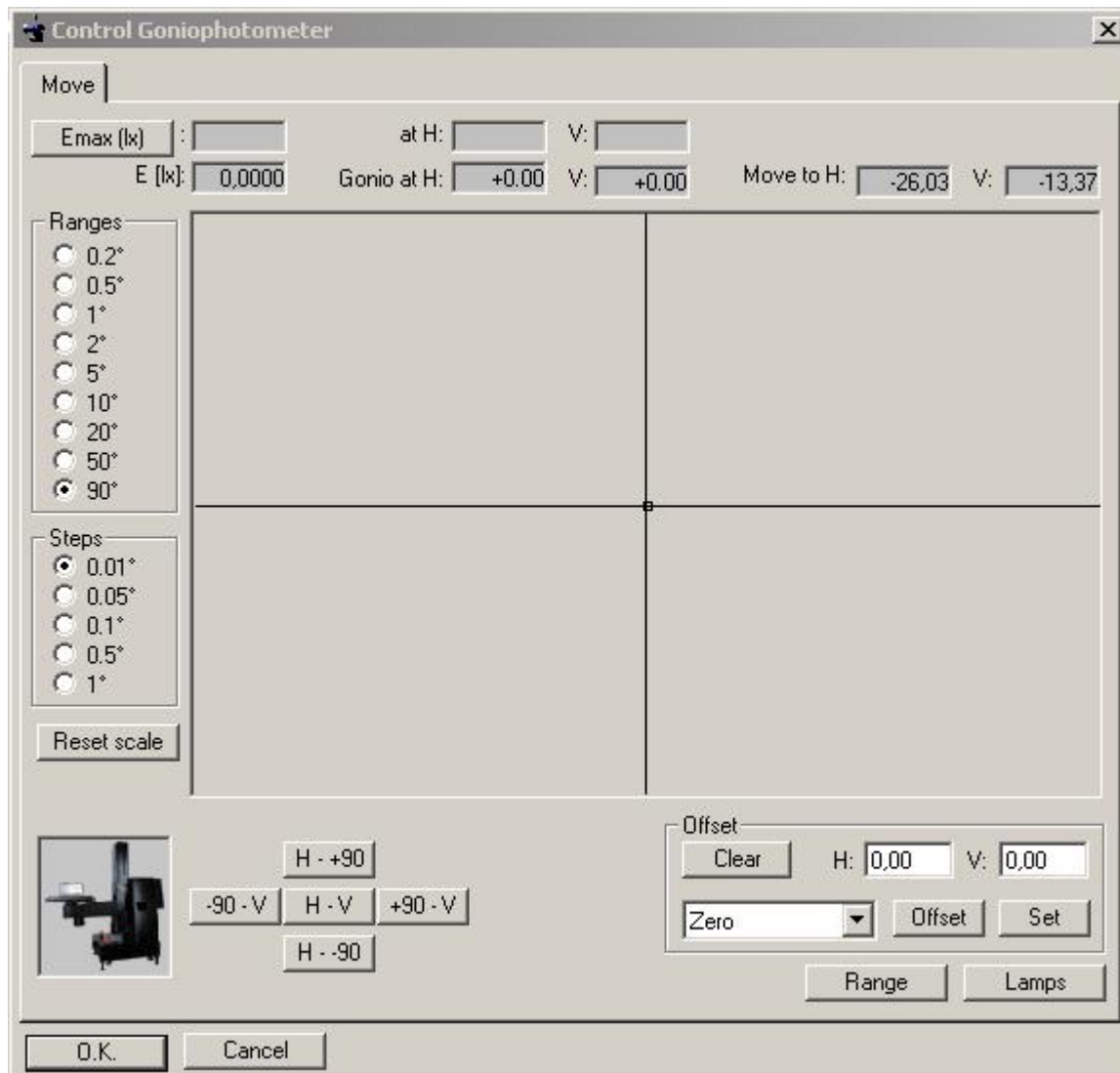
The rectangular screen with the vertical and horizontal line is the angular range screen of the goniometer. The left side corresponds with the maximum left horizontal angle, the right side with the maximum right horizontal angle. The bottom corresponds with the maximum lower vertical angle, the top with the maximum upper vertical angle.

The limits can be changed with the settings in the range fields on the left side on the window.

The center of the window corresponds to the angles H and V equal to Zero (HV).

The actual position of the goniometer is indicated by the small square. In the example the square appears in the center, this indicates the goniometer is actually in the HV position.

If the mouse is moved across this window, the mouse pointer changes into a cross hair. On top of the window appear 2 fields displaying the angular values which correspond to the position of the mouse pointer in the window.

To move the goniometer into a new position:

- ❑ Moving the mouse pointer into the desired position on the screen.
- ❑ Clicking on the left mouse button
- ❑ The goniometer starts moving to the angular position according to the mouse pointer position
- ❑ The square on the screen moves with the movement of the goniometer.

❑ Dragging the mouse (moving the mouse pointer while holding down the left mouse button) changes the position to which the goniometer moves, therefore the goniometer is following the mouse.

❑ Releasing the mouse button switches the goniometer movement off. Due to delay caused by the motor control of the goniometer the movement ends with a soft stop.

Steps:

The mouse pointer changes its position with increments given by the selected steps.

> *Tip:*
> *If the goniometer shall be moved for example to a position of 5.00 deg, it is easier to find these position after selecting a larger step (e.g. 1 deg)*

Reset Scale: Resetting the ranges and steps to the default value

Emax: Clears the field with the maximum measured photometer value during movement. The fields also show the actual position of the maximum.

Move buttons: The move buttons on the lower left corner allow the moving of the goniometer back to the HV position or to other positions indicated by the caption of the buttons.

Range: During movement the photometer range is not changed. If an overrange or underrange occurs, the photometer can select a new range after clicking this button.

Lamps: This button allows the setting of lamp voltage or current with the connected power supply.

Offset setting

This offset is the difference of the goniometers absolute Zero position as given by the measurement with the digital angle encoders and a user-defined Zero position.

Clear: Clear the actual offset setting

Select photometer offsets: If a photometer head is not mounted into the optical axis of the goniometer, its offset angle as defined in the options/hardware settings of the LIMES main menu can be selected and used here.

Offset: The actual position is used as an offset.

Set: The actual position is used permanently.

O.K./Cancel: This ends the goniometer control window

Control goniometer (GO-DS)

This describes the functions of Control goniometer for a goniophotometer with mirror arrangement, like LMT GO-DS 1600 or GO-DS 2000, or a luminous flux integrator, like GO-FI 2000.

> *Note:*
> *The angle Gamma which measures the rotation of the mirror axis in a mirror goniophotometer is identical with the angle of the photometer head rotation in a luminous flux integrator*

Move Goniometer: Allows the movement of both goniometer axis individually or at the same time

Select angle C: Pull down and select an angle from the list

Select angle Gamma: Pull down and select an angle from the list

Move to C: Moves the luminaire axis to the selected angle C by rotating the luminaire arm

Move to Gamma: Moves the mirror axis to the selected angle C by rotating the mirror

Move to C and Gamma: Moves both axes to the selected angles C and Gamma

Offset: Allows to enter or select the actual position as on offset angle for the rotation of the luminaire

Offset C: Enter a value to be the new offset angle

Set: Sets the value in the Offset C field as a new offset angle

Clear: Clears the offset angle

Set actual position: Reads the actual angle C and sets it as a new offset angle

Move goniometer: Allows movement to predefined positions

Move to C0/G0: Moves to the Zero position

Move to 0/180: Moves to the position C = 0 deg and Gamma = 180 deg

Rotate light source: Allows the continuous rotation of the light source with the selected speed

Speed: Select a rotation speed from the pull down list. The speed corresponds to the speed display at the goniometer control-unit

Start: Starts the continuous rotation of the light source with the selected speed

Stop: Stops the rotation

Measure luminous flux: Allows the measurement of the luminous flux of a lamp or a luminaire directly from this window

Start Gamma: Start angle of the luminous flux integration

Stop Gamma: End angle of the luminous flux integration

C-Speed: Sets the rotation speed of the lamp during measurement

G-Speed: Sets the rotation speed of the mirror axis (angle gamma) during measurement

2 ms / 20 ms: Select analog integration time of the photometer-unit if available

Start: Starts and performs a luminous flux measurement

▭ Luminous flux integration

Control goniometer (GO-V)

This describes the functions of Control goniometer for a goniophotometer with turning device, like LMT GO-V 1900 etc.

The solution of angular values and the angular ranges depend on the available goniometer type. For a GO-V 1900 the resolution is maximal 0.1 deg.

The following window appears:
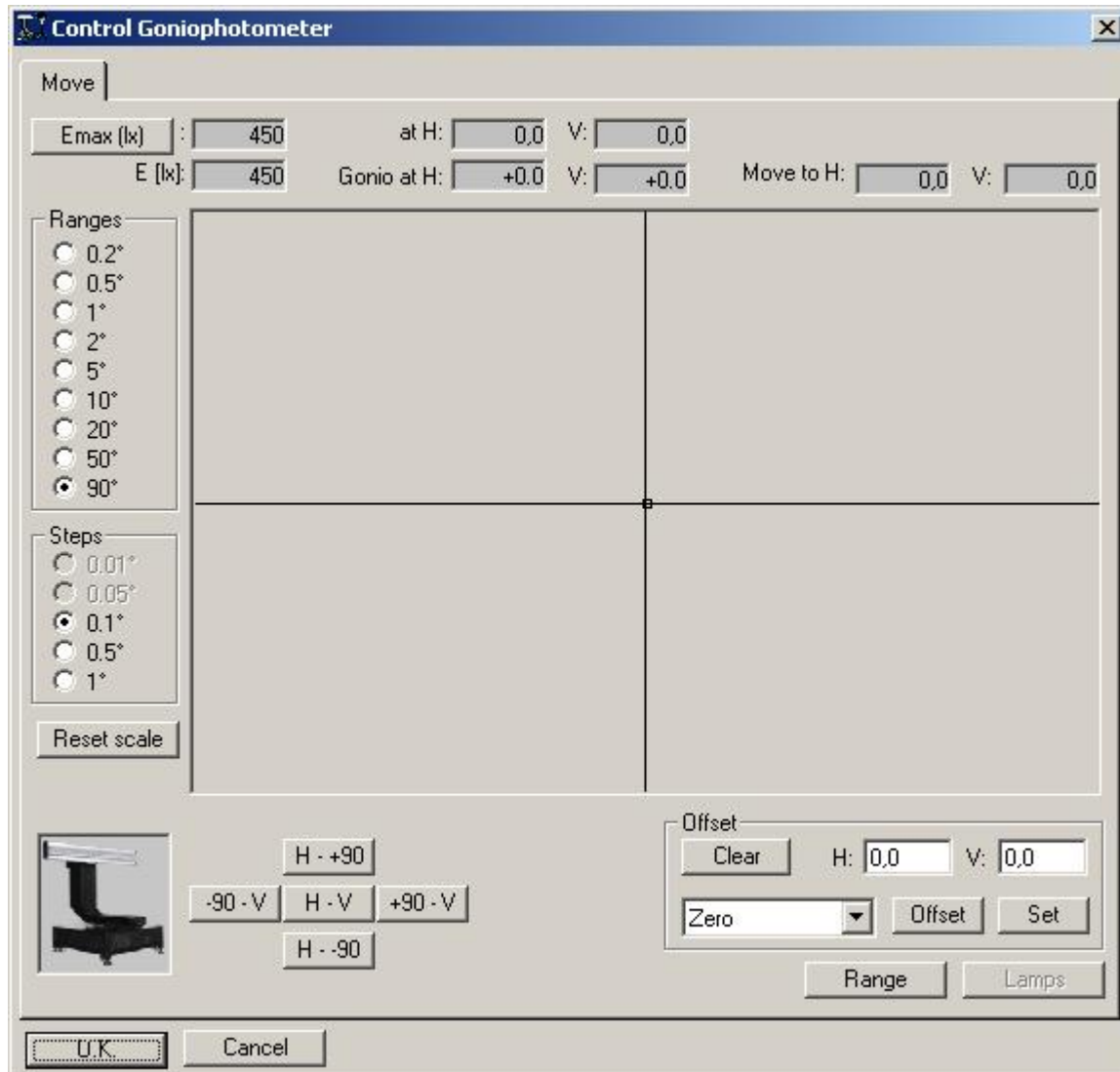
The rectangular screen with the vertical and horizontal line is the angular range screen of the goniometer. The left side corresponds with the maximum left horizontal angle, the right side with the maximum right horizontal angle. The bottom corresponds with the maximum lower vertical angle, the top with the maximum upper vertical angle.

> *Note:*
> *The horizontal angle refers to the C.angles of the goniophotometers co-ordinate system, the vertical to the angle Gamma. This angles have been chosen here as the movement characteristics of the GO-V allows positive and negative values in ranges from −180 to +180 deg.*

The limits can be changed with the settings in the range fields on the left side on the window.

The center of the window corresponds to the angles C and Gamma equal to Zero (HV).

The actual position of the goniometer is indicated by the small square. In the example the square appears in the center, this indicates the goniometer is actually in the HV position.

If the mouse is moved across this window, the mouse pointer changes into a cross hair. On top of the window appear 2 fields displaying the angular values which correspond to the position of the mouse pointer in the window.

To move the goniometer into a new position:

- ❑ Moving the mouse pointer into the desired position on the screen.
- ❑ Clicking on the left mouse button
- ❑ The goniometer starts moving to the angular position according to the mouse pointer position
- ❑ The square on the screen moves with the movement of the goniometer.
- ❑ Dragging the mouse (moving the mouse pointer while holding down the left mouse button) changes the position to which the goniometer moves, therefore the goniometer is following the mouse.
- ❑ Releasing the mouse button switches the goniometer movement off. Due to delay caused by the motor control of the goniometer the movement ends with a soft stop.

Steps:

The mouse pointer changes its position with increments given by the selected steps.

> *Tip:*
> *If the goniometer shall be moved for example to a position of 5.00 deg, it is easier to find these position after selecting a larger step (e.g. 1 deg)*

Reset Scale: Resetting the ranges and steps to the default value

Emax: Clears the field with the maximum measured photometer value during movement. The fields also show the actual position of the maximum.

Move buttons: The move buttons on the lower left corner allow the moving of the goniometer back to the HV position or to other positions indicated by the caption of the buttons.

Range: During movement the photometer range is not changed. If an overrange or underrange occurs, the photometer can select a new range after clicking this button.

Lamps: This button allows the setting of lamp voltage or current with the connected power supply.

Offset setting

This offset is the difference of the goniometers absolute Zero position as given by the measurement with the digital angle encoders and a user-defined Zero position.

Clear: Clear the actual offset setting

Select photometer offsets: If a photometer head is not mounted into the optical axis of the goniometer, its offset angle as defined in the options/hardware settings of the LIMES main menu can be selected and used here.

Offset: The actual position is used as an offset.

> *Note:*
> *Using an offset angle for both angles Gamma and C is possible, but leads to deviations of angular measurements at higher angles. Offsets should be avoided or used with special precautions only, and should if ever used applied only to the angle Gamma.*

Set: The actual position is used permanently.

O.K./Cancel: This ends the goniometer control window

Flux integration

Luminous flux integration

The integration of luminous flux (flux mesurement) is a complex measurement function available for goniophotometers with mirror arrangement, like LMT GO-DS 1600 or GO-DS 2000, or luminous flux integrator, like GO-FI 2000.

The flux measurement can be performed from two different starting points:

- ❑ From a test program of the Limes program with a program function "Integration"
- ❑ From the Control goniophotometer window in the LimesControl program

The measurement process is as follows:

- ❑ Move to a start angle Gamma
- ❑ Start the continuous rotation of the lamp axis with the selected C-speed
- ❑ Allows a lamp stabilizaton for a given period of time while the light source is rotating
- ❑ Start the movement of the angle Gamma (mirror axis on a GO-DS or photometer arm on a GO-FI
- ❑ Continuously read the illuminance or intensity distribution of the light source, while virtually moving the photometer head on a spirale around the light source
- ❑ Integrate the luminous flux continuously while measuring
- ❑ Stop the movement of angle Gamma when the end angle is reached
- ❑ Stop the rotation of the light source
- ❑ Displays the result
- ❑ Move the goniometer to the mounting position

Luminous flux measurement

When the luminous flux measurement starts, the goniophotometer move the axis with the angle Gamma to the start position and then starts to continuously rotate the light source.

The automatic measurement routine allows the stabilization of the light source while rotating for a certain period of time. To interrupt the stabilization click on the stop button
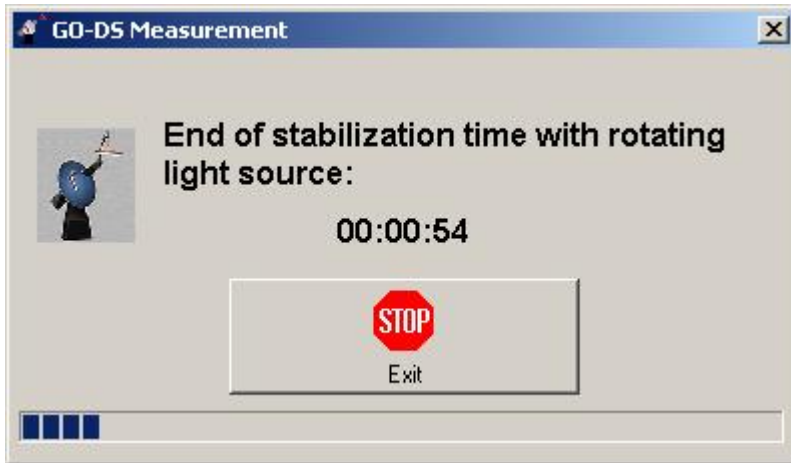
If interrupted, you are asked whether to start the flux measurement or to cancel. If canceled the goniometer moves back to the mounting position. The default condition on this window is continue the measurement.
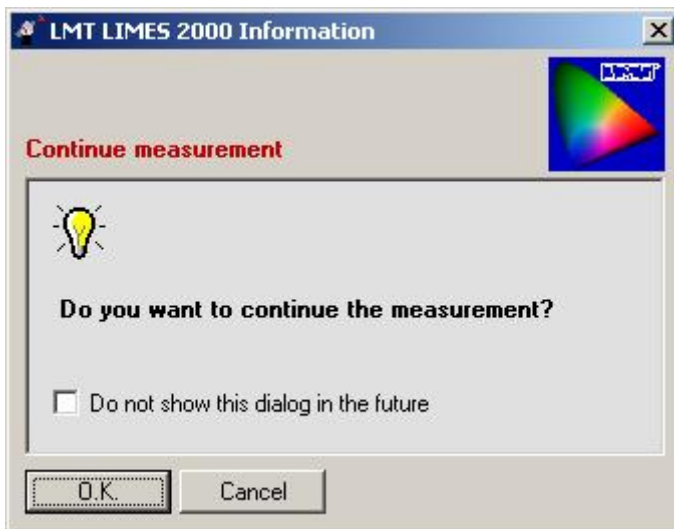
After the rotation of the angle Gamma is started, this window displays the measured luminous flux and updates this value continuously. The status bar indicates the percentage of measurement time elapsed compared to the total time required. If the Stop button is clicked, the movement stops and the goniometer moves back to the mounting position.

If during the integration a range switch of the photometer is necessary, the goniometer angle Gamma movement stops, the goniometer moves the photometer head position back to a lower angle, sets the new range and continues. The lamp rotation is not stopped during the ranging.
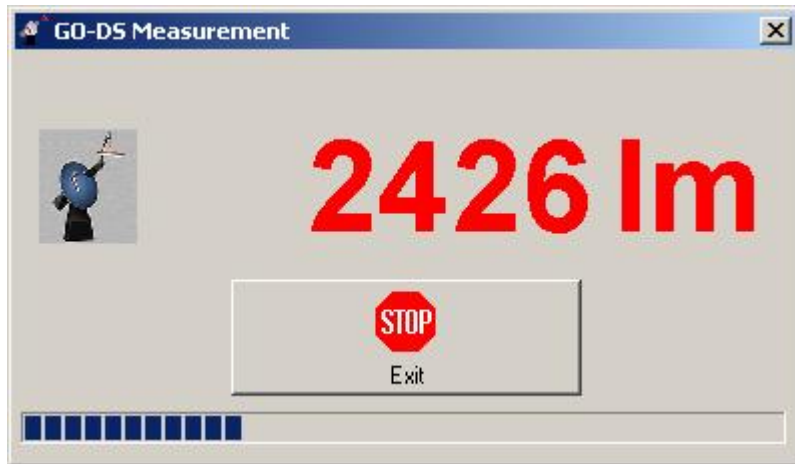
When the angle Gamma reaches the end position, the rotation of the light source is stopped.
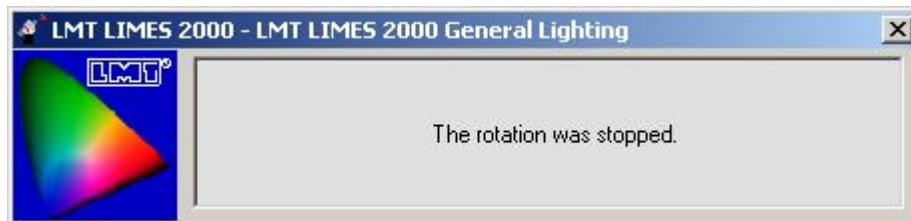
The total luminous flux value is displayed. Close the window by clicking at the Close button.
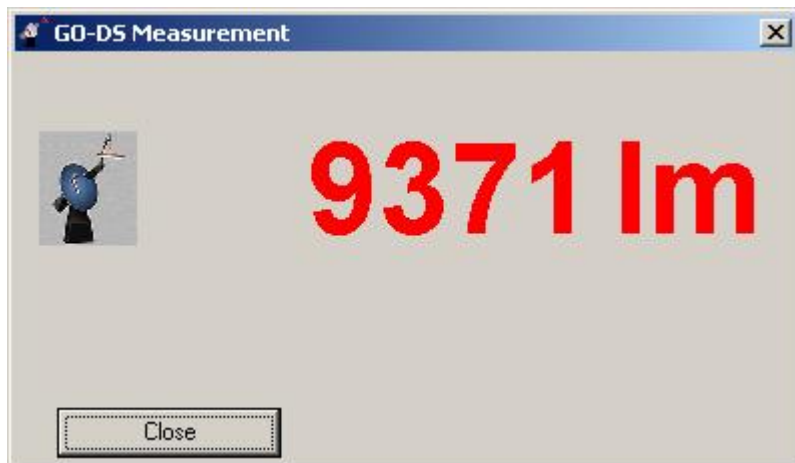
The luminous flux value also appears in the window of the phootmeter-unit in the LimnesControl main window.

When being started from the Control goniometer window, the flux value is also shown there.
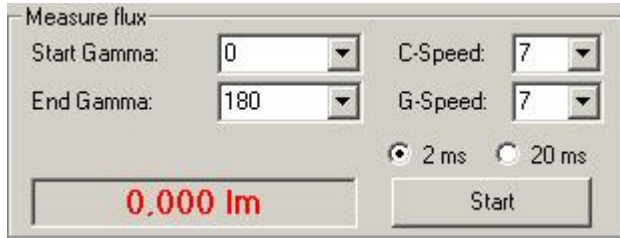
Hardware test

General hardware test

This hardware test allows several test routines carried out for the connected hardware devices. Interface addresses can be verified and interface connections can be tested as well.
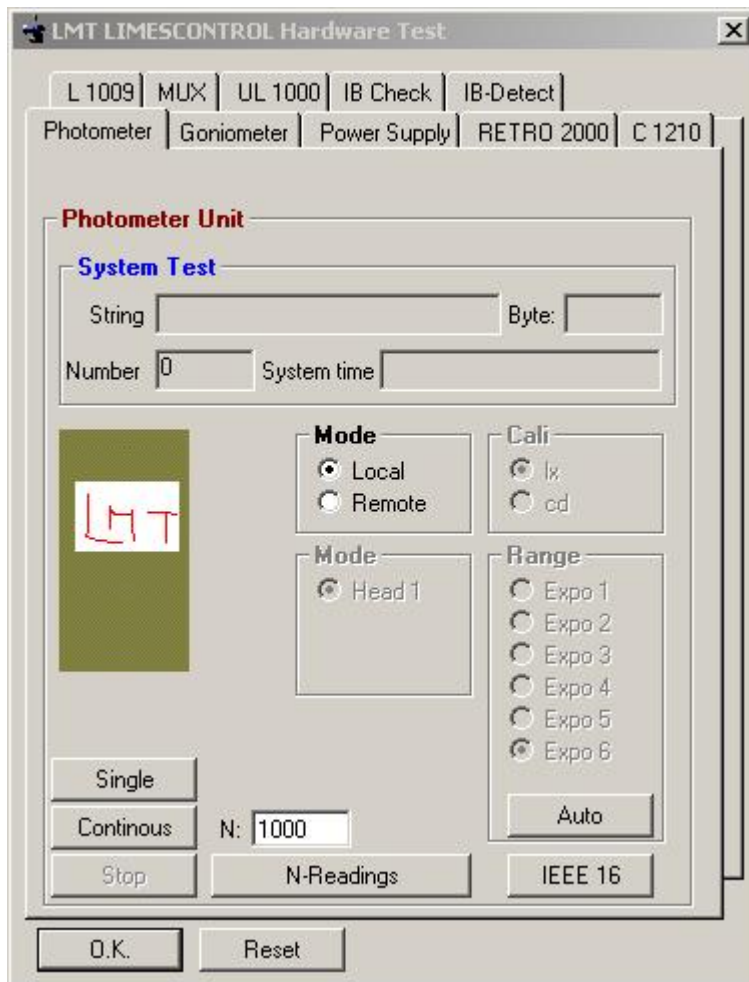
In this window the various functions can be slected by clicking on the corresponding tab on top of the window.

O.K.: Terminates the hardware test and closes the window

Reset: Resets the IEE 488 interface bus by sending an abort and reset command to all connected devices. Can be used if the interfaces system hangs when an instrument does not respond to a selected interface command.

▭ Photometer

■ Goniometer

Power supply

■ Interface

■ Interface detection

Test photometer

This window allows the testing of the communication with the goniophotometers photometer unit.
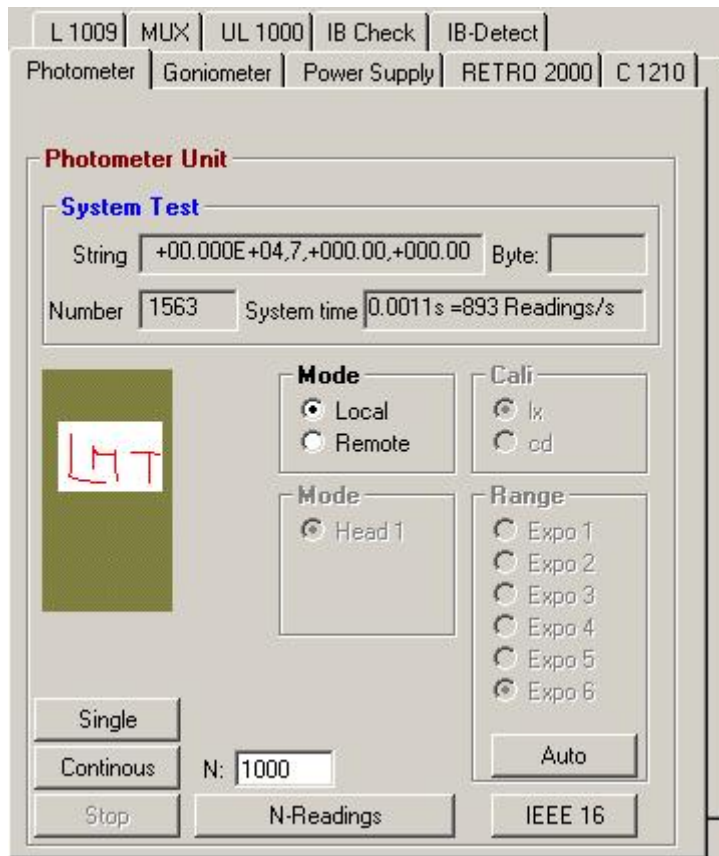
System test:

String: Initially empty. The string send by the photometer unit via the interface on request of the PC is displayed. This string is formatted as described in the corresponding goniophotometers interface hardware manual.

Number: The number or readings performed with this test.

System time: Shows the capability of the computers interface and gives the actual time for one reading of the photometer unit.

Single: Performs a single reading from the goniometer. Immediately after clicking the response from the photometer is displayed in the String field.

Continuous: Performs continuously readings from the goniometer. Immediately after clicking the responses from the photometer are displayed in the String field and the number of passed readings are shown.

Stop: Stops continuously readings.

N-Readings: Performs the number of readings without intermediate display of strings during test. As indicated by the number in field **N**

Mode local: Photometer is in local mode. Selected heads and ranges as forced by the switches on the photometer unit

Mode remote: Photometer is in remote mode. Selected heads and ranges as forced by the settings on this test.

Mode heads: Selects the proper head when in remote mode.

Cali: Sets the calibration of the photometer unit and forces the display to be made in either one of the available settings, e.g. lx or cd, when in remote mode.

Ranges: Sets the photometer measuring range of the selected head when in remote mode.

Auto: Performs auto ranging by the software when in remote mode

IEEE 16: Tests the interface communication with the instrument set to the interface device address. In this example to 16. After processing a message is displayed. In case of communication error the reason for failure is shown as indicated as example below:

To test again, confirm yes. To end press No or Cancel.

 Hardware test

Test goniometer

This window allows the testing of the communication with the goniophotometers control unit.
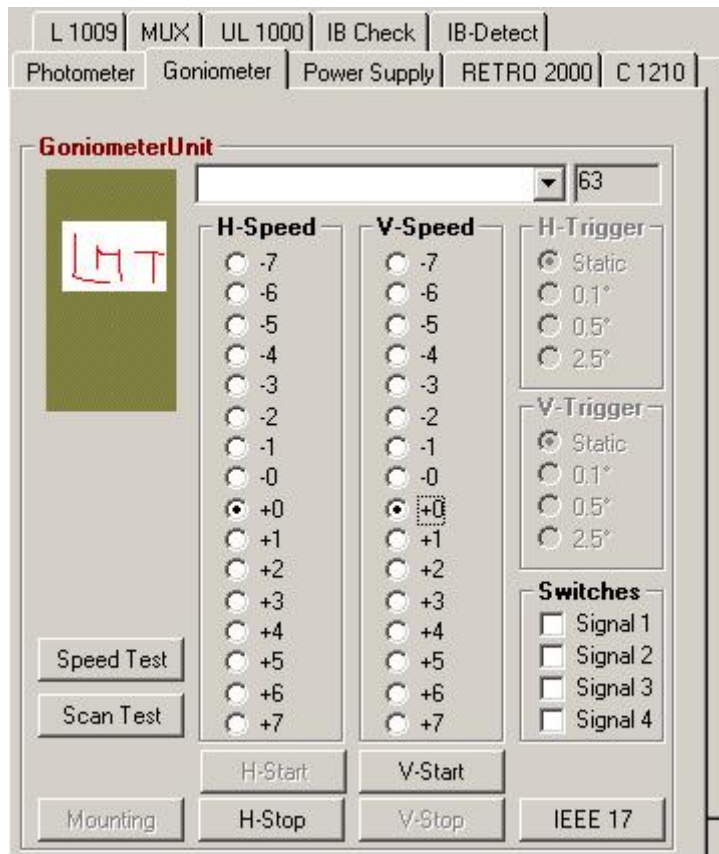
H-Start: Starts the horizontal motor. No movement as the default speed is selected as Zero.

V-Start: Starts the vertical motor. No movement as the default speed is selected as Zero.

H-Speed: Selects the movement speed. After clicking on one of the buttons the speed indicator on the control unit in the electronic rack should display the same value. When the motor is started the goniometer actually moves in the selected horizontal direction by rotating the mounting table.

V-Speed: Selects the movement speed. After clicking on one of the buttons the speed indicator on the control unit in the electronic rack should display the same value. When the motor is started the goniometer actually moves in the selected vertical direction by rotating the goniometers arm

H/V-Trigger: This sets the indicated triggering based on goniometer movement and changing of the angular position. The photometer unit only responses if the goniometer has passed the stated angular increments. This can only be selected when the goniometer is moving.

> *Note:*
> *If the goniometer moves to slowly and a dynamic 2.5 deg trigger is selected, it can take to long time until the goniometer passes an angle which can be devided by 2.5, e.g. 25, 27.5, 30, 32.5 etc. If the timeout of the interface is shorter than the time needed by the goniometer to reach the next angle an interface timeout occurs and a message is displayed. Either change the speed setting of the interface timeout time in the options setting.*

Signals: This activates or deactivates one of the relay outputs of the goniometer control rack.

IEEE 17: Tests the interface communication with the instrument set to the interface device address. In this example to 17. After processing a message is displayed. In case of communication error the reason for failure is shown.

Speed Test: Allows the setting and control of goniometer movement speeds.

Scan test: Allows the checking of behavior of the goniophotometer system when performing scan measurements (reading of the photometer unit at certain angles without stopping the goniometer movement).

 Hardware test

Goniometer speed test

This test allows to control the hardware settings of the goniometer rotation speed by measurement and display in a speed test window.
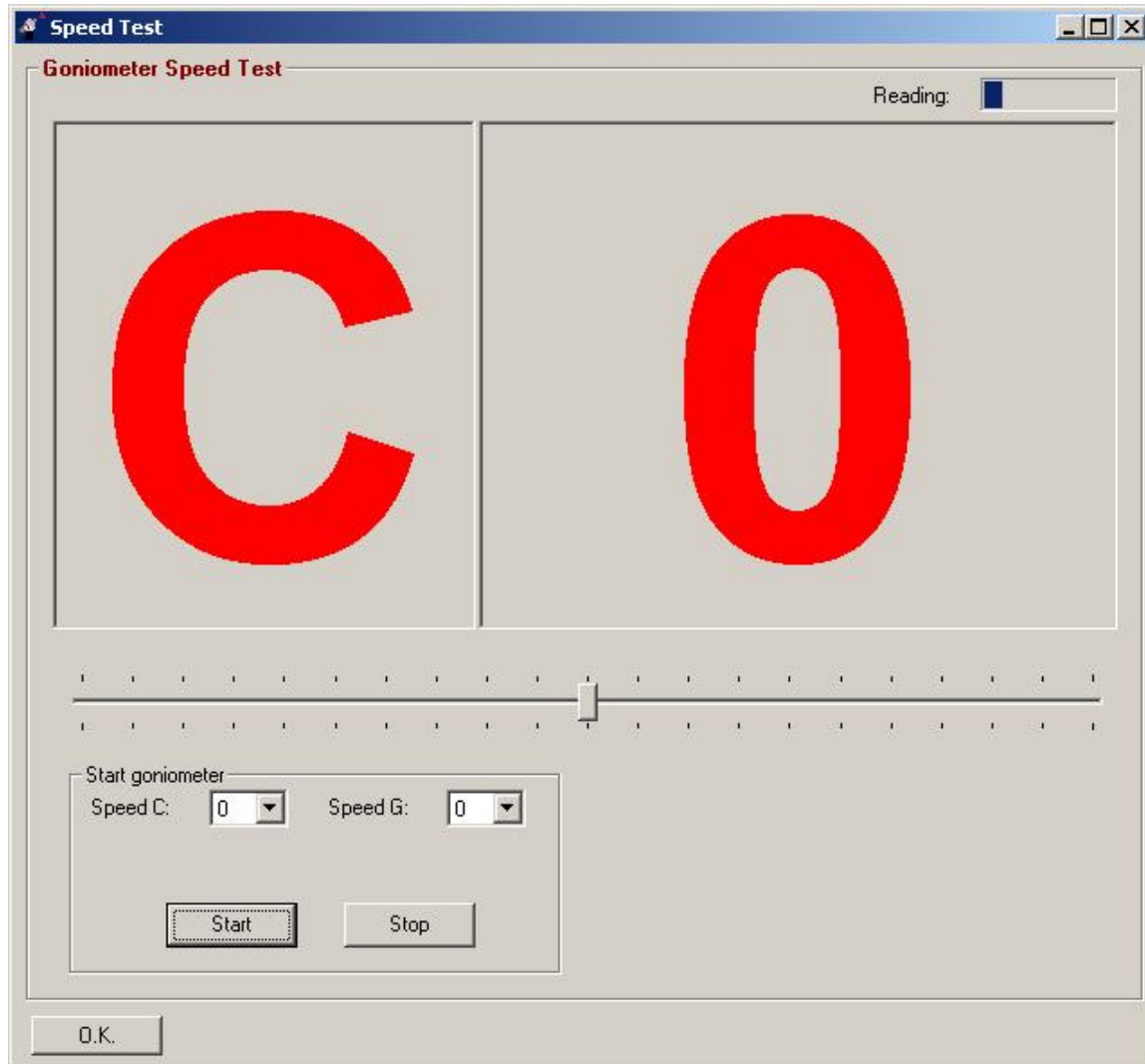
To perform a speed test you can either set the speed manually at the speed switches of the goniometer control-unit or by clicking on the start and stop buttons in this window.

> *Note:*
> *You have to set the Auto-Stop-Manual switch to Auto position before you can control the goniometer from the computer*

The **big window** shows the speed of angle C or Gamma which the computer calculates from the measurements.

The **moving status bar** on the top right corner indicates that the goniometer is really measuring with reading the angles.

The **slider** indicates the deviation of the actual speed from the defined default speed. As long as the sliders button is within the central area the speed is correct. If it is more than half to the left, the speed is too slow. If more than half to the right, the speed is too high.

Note
:The calculated and displayed speed value (from –7 to +7) must be identical to the speed display on the goniometer control-unit

If the speed is too slow or too high, it has to bee corrected by using the postentiometers on the boards within the control-unit. Refer to the goniophotometers hardware manual for location of these potentiometers and for more information.

Start goniometer: To start a rotation at a certain speed select the speed from the **pull down lists** and click on the **Start** or the **Stop** button

OK: Terminates this window when clicked

Test TeleControl

This window allows the testing of the communication with the TeleControl.
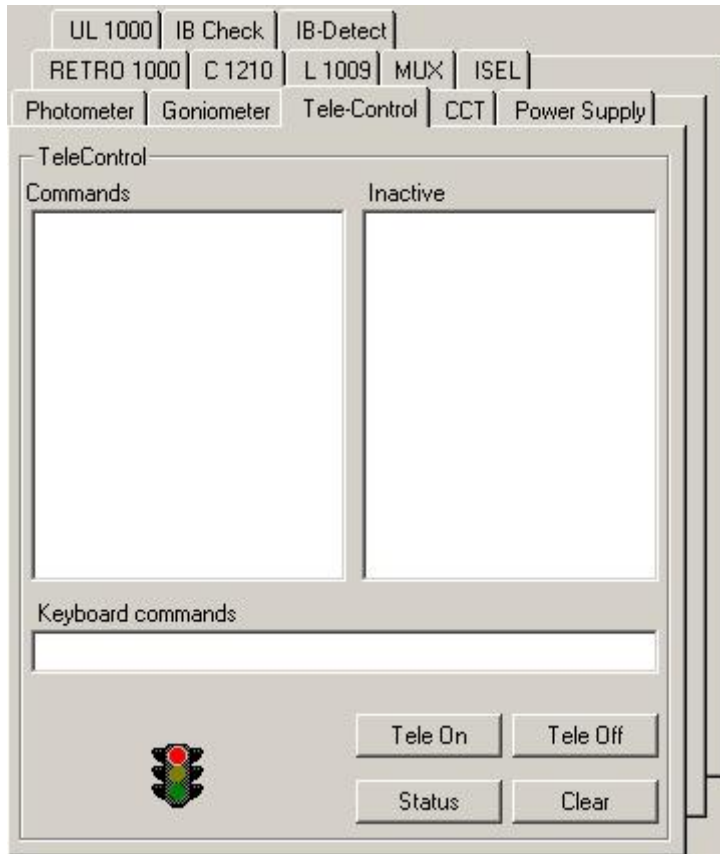
Test power supply

This window allows the testing of the communication with the power supplies.
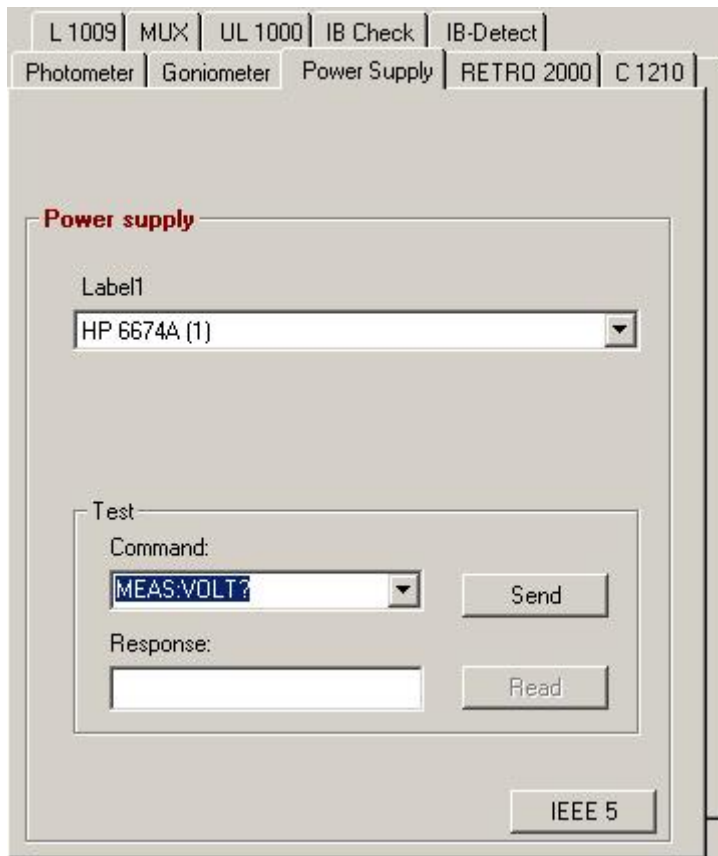
Label 1: This shows the selected device

Command: A valid command for the selected device can be entered.(Example SCPI request for reading the voltage)

Send: Send the command in the command field to the power supply. After success the Read button is enabled for reading the response

Read: Reads the response of the instrument and displays in the response field.

IEEE 5: Tests the interface communication with the instrument set to the interface device address. In this example to 5. After processing a message is displayed. In case of communication error the reason for failure is shown.

Hardware test

Test Interface

This window allows the testing of the communication with the selected device, generally used fro devices communicating via IEEE 488 trigger commands, such as LMT goniophotometers, colorimeters, etc.

Device addresses: Select the device you want to test

Control byte: Enter a control byte which is given in the devices interface hardware manual

Read: Reads the response from the device and displays the response string as given in the devices interface hardware manual

 Hardware test

Test interface detection

This window allows the detection of devices connected to the IEEE-488 interface board. This can be used if the device address of the connected instrument is unknown or shall be verified.

First/last device addresses: A device address can only be in the range between 0 and 31. The detection can be narrowed to a smaller range (per example from 10 to 20) to make the function faster.

Timeout: Maximum time limit for a response of a device in ms.

Detect: After clicking on the Detect button the program checks all selected device addresses in the selected address range. If a unit is found it appears in the list. (Example photometer unit of a GO-H 1300 S is found on address 16, and a goniometer unit of a GO-H 1300 S is found on address 17. The values in brackets shows the reponse string of the device.

Device addresses: Allows the comparison with the available devices as configured in the options settings of the LIMES software.

 Hardware test

Options

General options

The options windows allow the modification of several parameters for the operation of the LimesControl program.

Generally all settings should be done in the Limes hardware options. In the case the LimesControl program is installed on a different computer, it is possible to change the basic setting here as well.
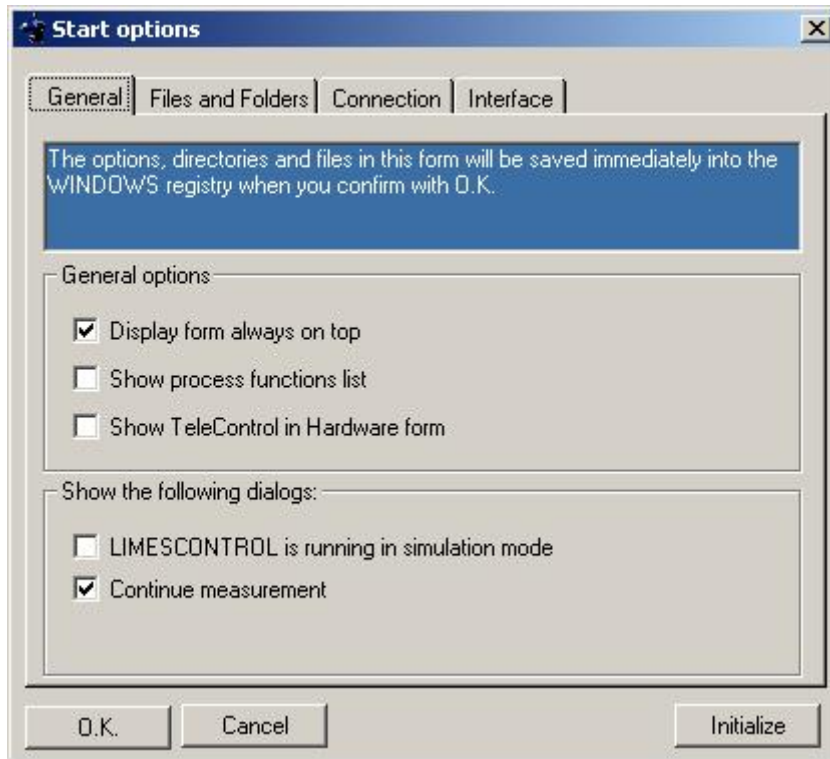
Files and Folders

This window allows the setting of files and folders used by the LimesControl program.

General	Files and Folders	Connection	Interface

Files and Folders

To change the location of one of the system files please press the browse button of the right side of the textfield.
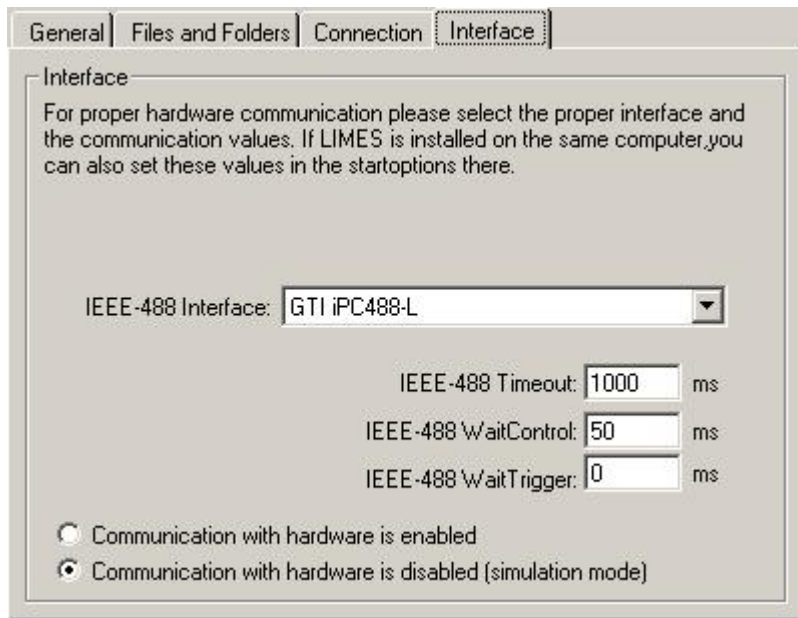
Common folder:	
.INI file:	C:\Vb60-Lmt\Limes\LMTData\Limes.ini
User database file:	C:\Vb60-Lmt\Limes\LMTData\LMTUser.udb
Output file:	C:\Vb60-Lmt\Limes\OUT{LMT}.LMT
Input file:	C:\Vb60-Lmt\Limes\IN{LMT}.LMT
Help file:	C:\Vb60-Lmt\Limes\Help\LimesControl.hlp
Sound file:	C:\Vb60-Lmt\Limes\Sounds

Connection

This window allows the setting of connection properties to the Limes program by the LimesControl program.

Interface

This window allows the setting of interface connection parameters used by the LimesControl program.

LimesControl log file

It is possible to create a log file by the LimesControl program which records the communication between LIMES and LimesControl and/or the communication between LimesControl and any instrument connected to the IEEE-488 interface bus. The log file is a Windows ASCII (text) file with the extension .log, which can be edited by any Windows editor (e.g. Notepad.exe).

The logfile can be enabled in either the LIMES or the LimesControl program.

Enable log file in LIMES

Select Options/Program/Connections from the LIMES main menu:
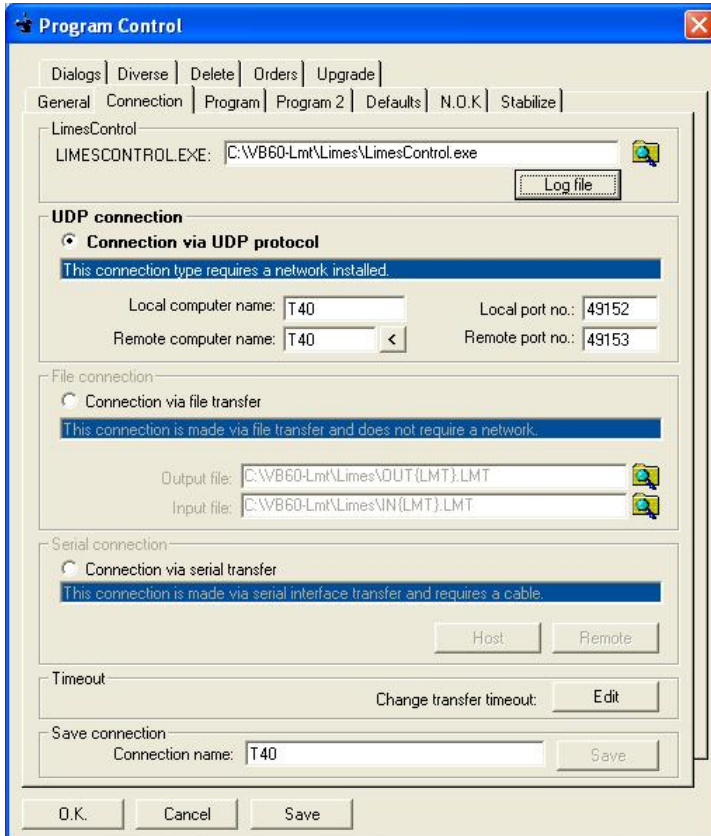
Click on the button '**Log file**' at the upper part of this window.

Enable log file in LimesControl

Select Options/Files and folders from the LimesControl main menu:
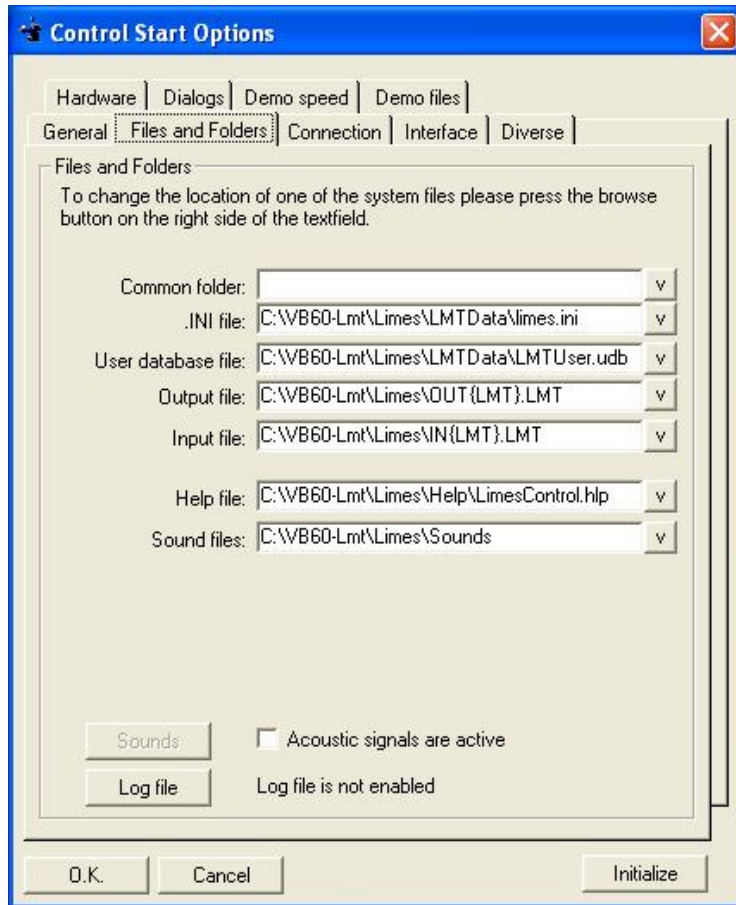
Click on the button **'Log file'** at the lower part of this window.

Edit log file settings

The following window allows the setting of parameters for the LimesControl log file:
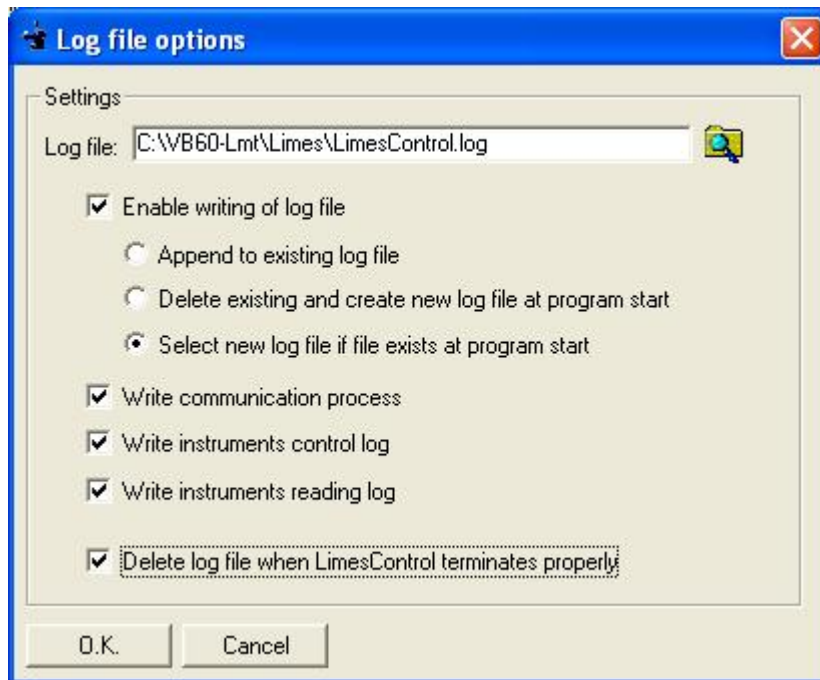
Log file: Shows the full path of the selected log file. Clicking on the folder icon allows you to select another log file, either an existing one or – by entering a new name – a new file.

Enable writing of log file: Click on the check box to enable log file writing. If the check box is unchecked, no further settings can be made.

Append: If checked the log file data is appended to the selected log file, existing data in this file are not deleted.

Delete existing and create new: If the log file exists, it will be deleted and a new file with the same name is created.

Select new log file: At program start the window shown above is displayed and allows you to select a new log file, or use the existing one, which will be appended. You also can change the settings at this time.

Write communication process: The communication process between LIMES and LimesControl is recorded.

Write instruments control log: The communication from the LimesControl to any instrument connected to the IEEE-488 interface is recorded.

Write instruments reading log: The communication from any instrument connected to the IEEE-488 interface to the LimesControl is recorded.

Example of a LimesControl log file

```
08.03.2004 12:09:19> Create logfile
12:09:19 (0)> Process Receive: 2 I "Connect"CONNECT TESTPC
12:09:19 (31)> Process: Connection status: Connected to TESTPC
12:10:19 (59610)> Process Receive: 3 I "Initialize"INITIALIZE
12:12:47 (207656)> Add: 16 Dev: 31256 Write: IBINIT
12:12:47 (207656)>  Add: 16 Dev: 31256 Read:   +03.240E+00,7,+359.97,+001.04
12:12:47 (207656)>  Add: 16 Dev: 31256 Read:   +03.046E+00,7,+359.97,+001.04
12:12:52 (212563)> Add: 16 Dev: 31257 Write: IBRESET
12:12:52 (212578)> Add: 16 Dev: 31258 Write: IBABORT
08.03.2004 12:12:52> Terminate LogFile
```

_ _

Explanation:

- ❑ On 08.03.2004 at 12:09:19 the log file was created.

- ❑ At 12:09:19 (0 ms after creation of the log file) 'Process Receive: 2 I "Connect"CONNECT TESTPC' gets the request to be connected with the LIMES program on the PC 'TESTPC'.

- ❑ At 12:09:19 (after 31ms) 'Process: Connection status: Connected to TESTPC' confirms the connection to be established.

- ❑ At 12:10:19 (after 59.610 s) 'Process Receive: 3 I "Initialize"INITIALIZE' the LimesControl gets the request for re-initialization from the LIMES program on TESTPC.

- ❑ At 12:12:47 (after 207.656 s) 'Add: 16 Dev: 31256 Write: IBINIT' the IEEE-488 interface was addressed. The interface driver initializes the device 31256 for the instrument connected to the address 16 (photometer unit of the goniophotometer).

- ❑ At 12:12:47 (after 207.656 s) 'Add: 16 Dev: 31256 Read: +03.240E+00,7,+359.97,+001.04' the LimesControl reads the device string "+03.240E+00,7,+359.97,+001.04' from the device 31256 at address 16.

- ❑ At 12:12:47 (after 207.656s) 'Add: 16 Dev: 31256 Read: +03.046E+00,7,+359.97,+001.04' another reading from address 16.

- ❑ At 12:12:52 (after 212.563s) 'Add: 16 Dev: 31257 Write: IBRESET' an interface reset command was send to the address 16.

- ❑ At 12:12:52 (after 212.578s) 'Add: 16 Dev: 31258 Write: IBABORT' an interface abort command was send to the address 16.

- ❑ On 08.03.2004 at 12:12:52 the log file was terminated, as the LimesControl program was terminated.

Special applications

Automotive road lighting simulation

Isoroad Assistent

The Isoroad Assistent helps you to create an project to calculate the illuminance or intensity distribution on a road illuminated by automotive headlamps or other lamps installed into a vehicle standing on the road.

The Isoroad Assistant guides you step by step through the creation of the project. Once you are familiar with the project concept, you can also go immediately to the short form style, where you can manipulate the specifics of a project directly where you want.

With an assistant you can move forward and backward through the creation process of an isoroad lighting project. When you are finished with one step, you can either go forward to the next step by clicking on the forward button or go back by clicking on the back button.

When you cancel the assistant, your data are still available at the next time you start the assistant, but not after terminating the Limes program. To save a project you have to go to the last step on which you can save everything under a certain project name into a file with a special ASCII format.

More information about road lighting calculation see in Basic Concept

Isoroad Assistant: Start window

Use short form: Use the short form editor instead of the assistant

Do not show this assistant in the future: Use short form every time you create a project. You can go back to the assistant tool by enabling it in the Limes options program menu.

First step

The first step is the selection of a road from the roads database.
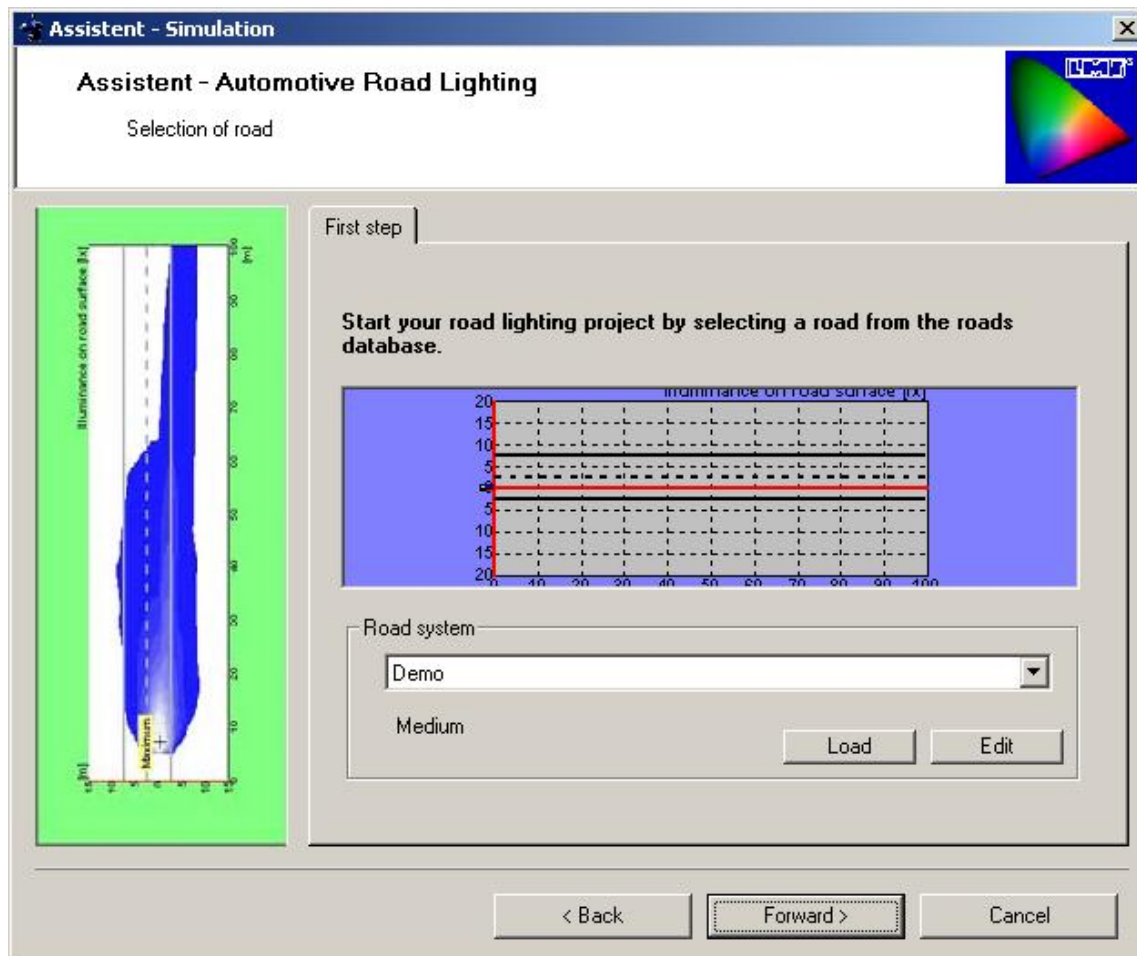
Isoroad Assistant: First step

Load: Loads a road system from the road database

Edit: Allows to modify the selected road system by using the road editor window.

Second step

The second step is the selection of an automobile from the automobile database.
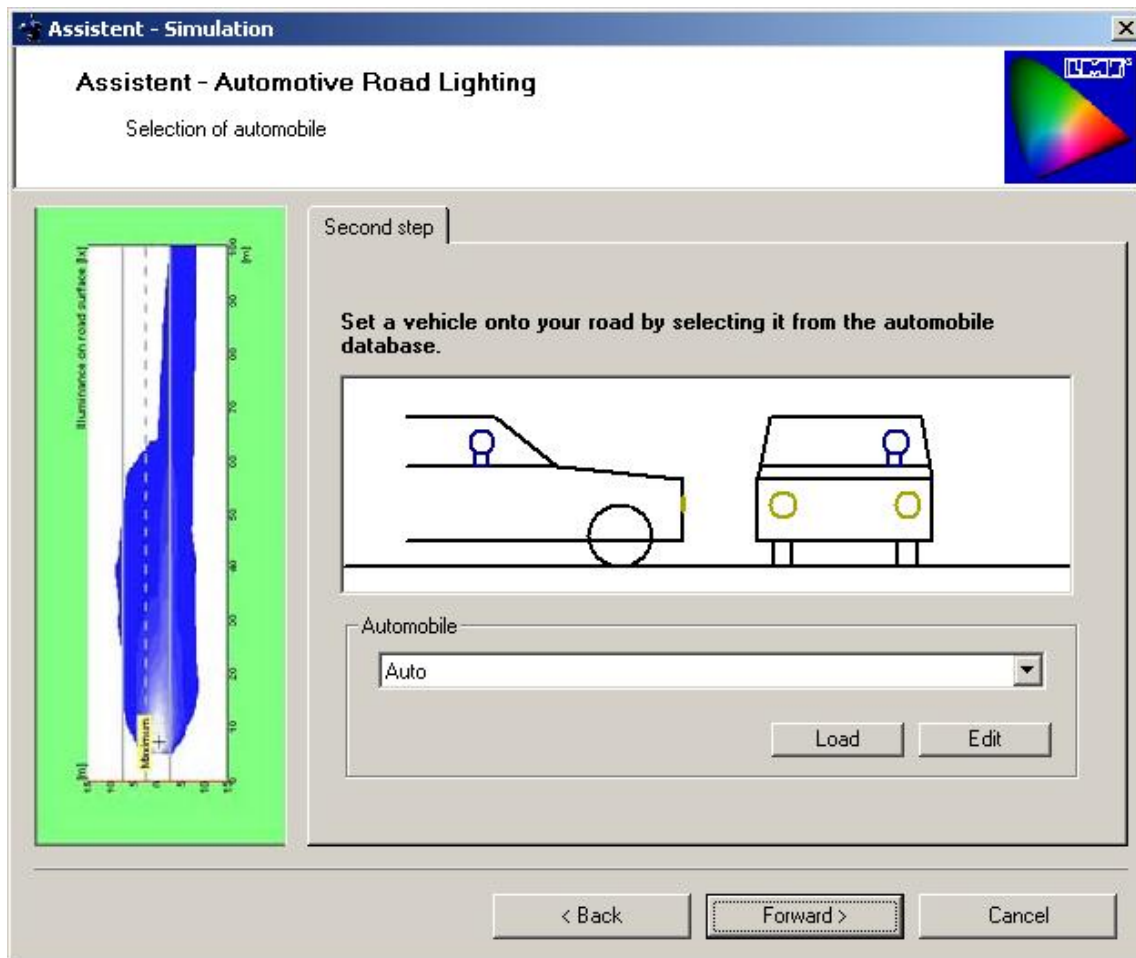
Isoroad Assistant: Second step

Load: Loads an automobile system from the automobile database

Edit: Allows to modify the selected automobile system by using the automobile edit window.

Third step

The third step is the selection of lamps to be installed into their assigned positions in the automobile. Lamps are defined as light distributions within test sample data files which are saved in the test sample database or which have been preloaded using the open file menu.
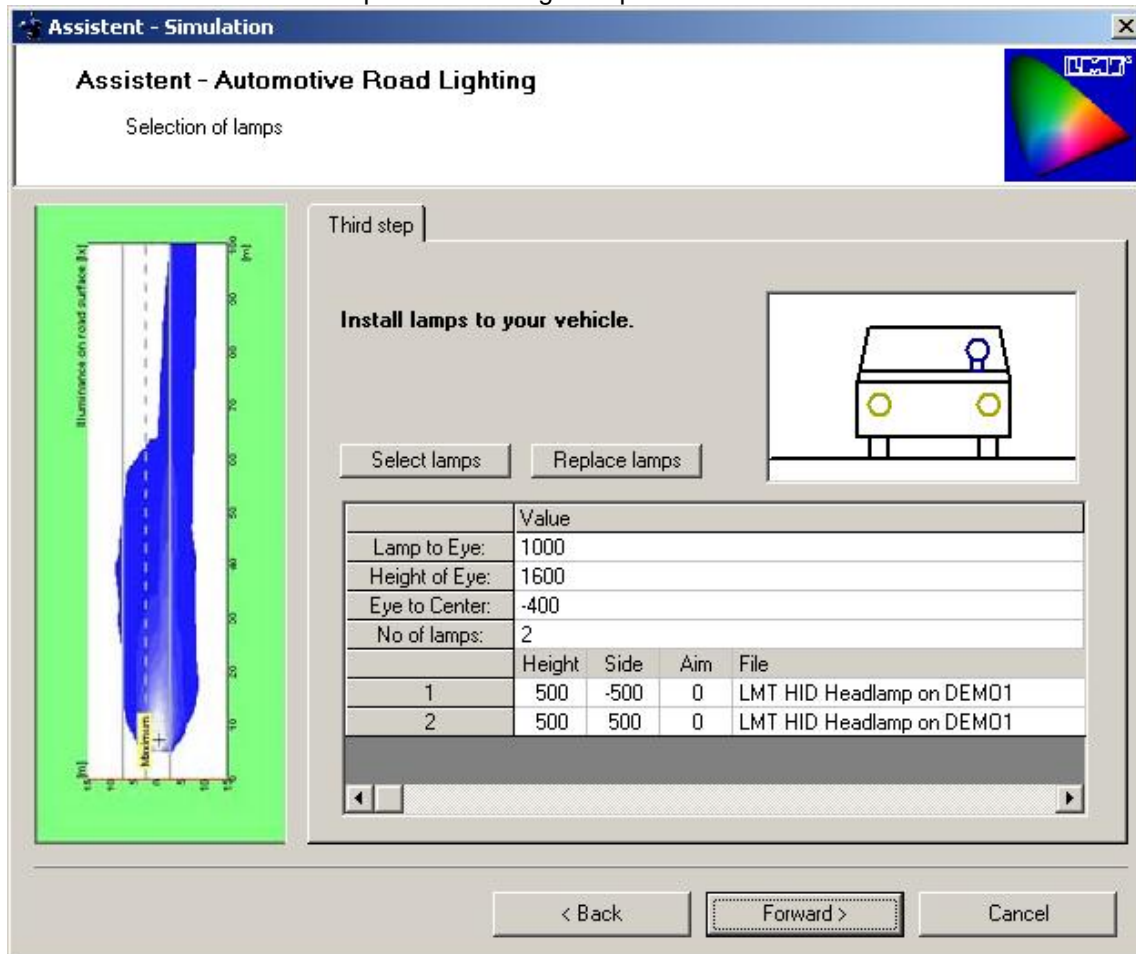
Isoroad Assistant: Third step

Select lamps: A pull down menu appears, where each menu shows an available lamp position of the automobile. To select a lamp, click on the menu

> *Note:*
> *If you are not sure which lamp corresponds with the lamp number, click on the lamp circle in the graphic or click on the lamp line in the value table.*

If you have preloaded one or more test sample data files, you can choose the light distribution from the following window:

Light distribution: Click on a name to pre-select

Remove files: Remove open files from the list of preloaded files

Database: Allows to open one or more test sample data files from the test sample database

OK: Accept the pre-selection and continues

Cancel: Throws away the pre-selection and continues

Replace lamps: Allows you to replace a certain lamp type wherever it is installed at the automobile with another lamp (light distribution of a test sample data file)

Fourth step

The fourth step allows you to select what happens after termination of the assistant. The project will be calculated and saved. You can decide whether you want to see the results immediately afterwards.

> *Note:*
> *Once a project has been calculated and saved, the results can be viewed or printed any time later from the evaluation menu after re-loading the project file.*
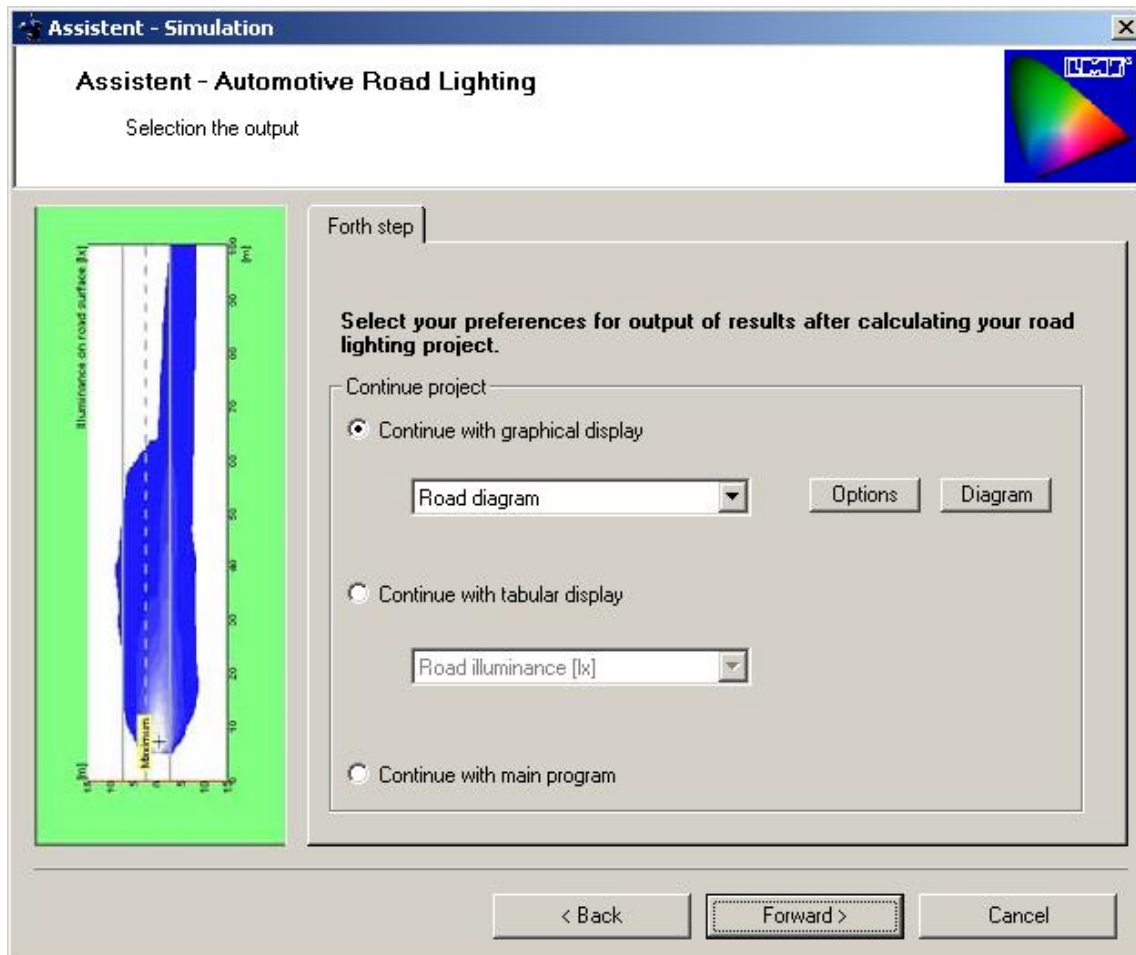
Isoroad Assistant: Fouth step

Continue with graphics: Select the type of diagram you want to see immediately after calculation

Options: You can pre-select isolux values which are used to display the light distribution in an isoroad diagram
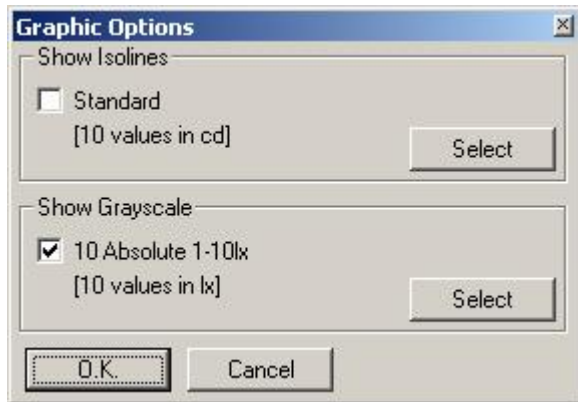
Diagram: You can set the properties of the graphics by clicking on this button
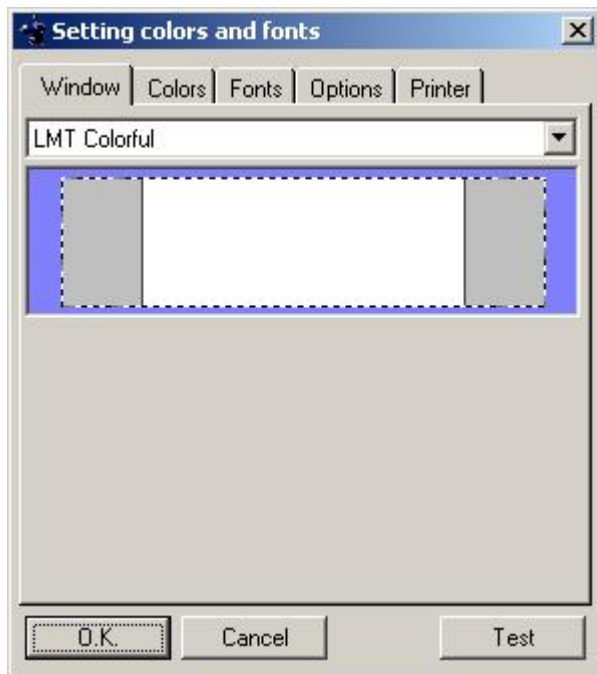
Continue with table: Select the type of table you want to see immediately after calculation

Continue with main program: Just calculate and save, see the results later

Fifth step

In the fifth step you enter a new or select an existing file name in your project folder.
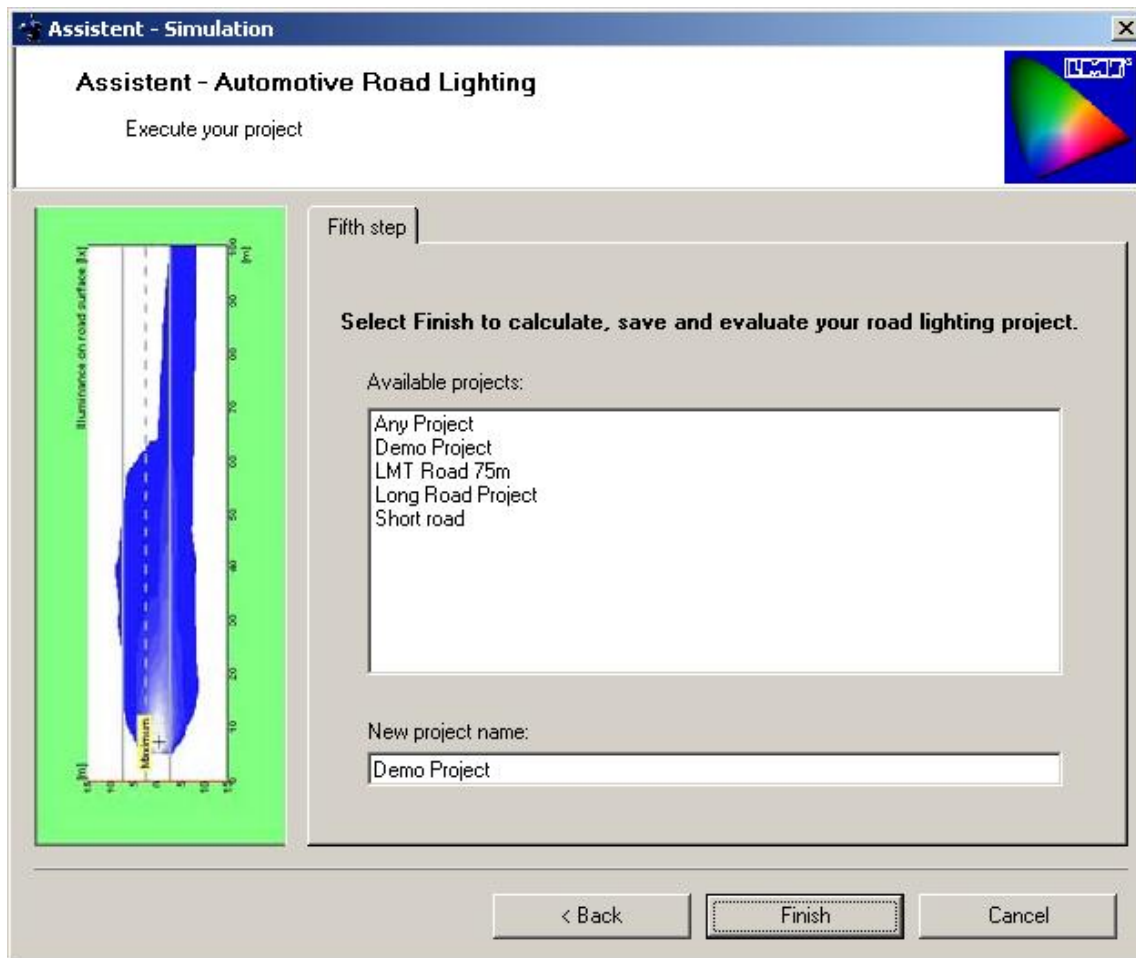
Isoroad Assistant: Fifth step

When you save the project, you can specify the project folder. Projects are saved as ASCII files in a special format (extension .lmp)
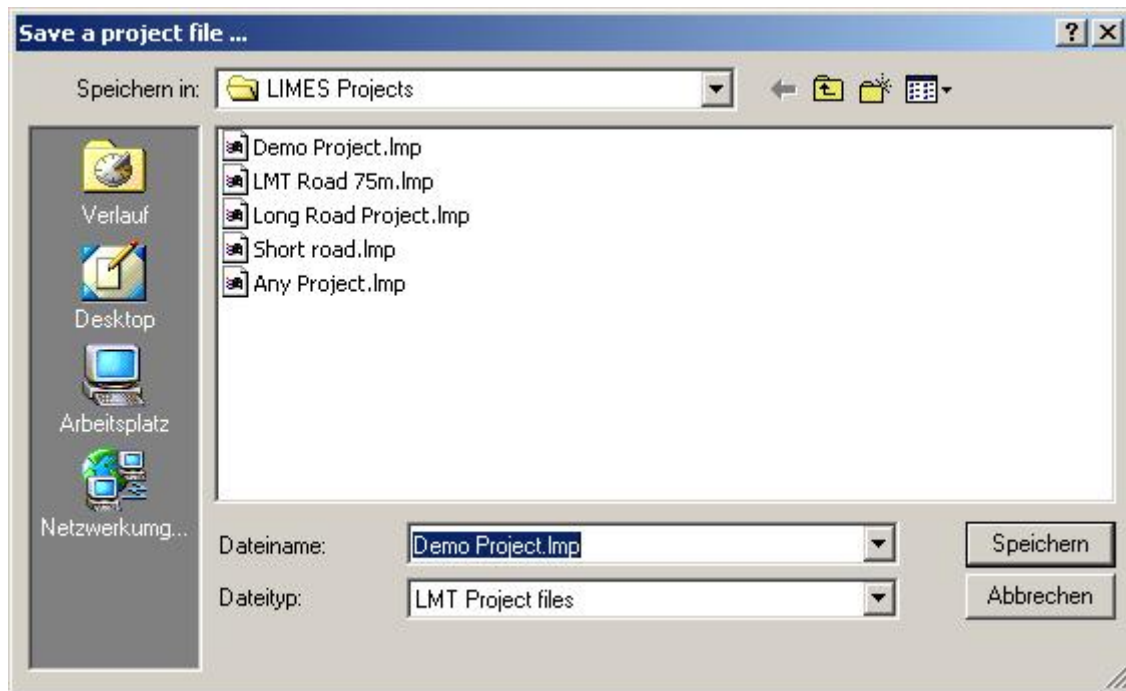
Short form

The short form editor allows all settings of a isorad project to be done from one window.
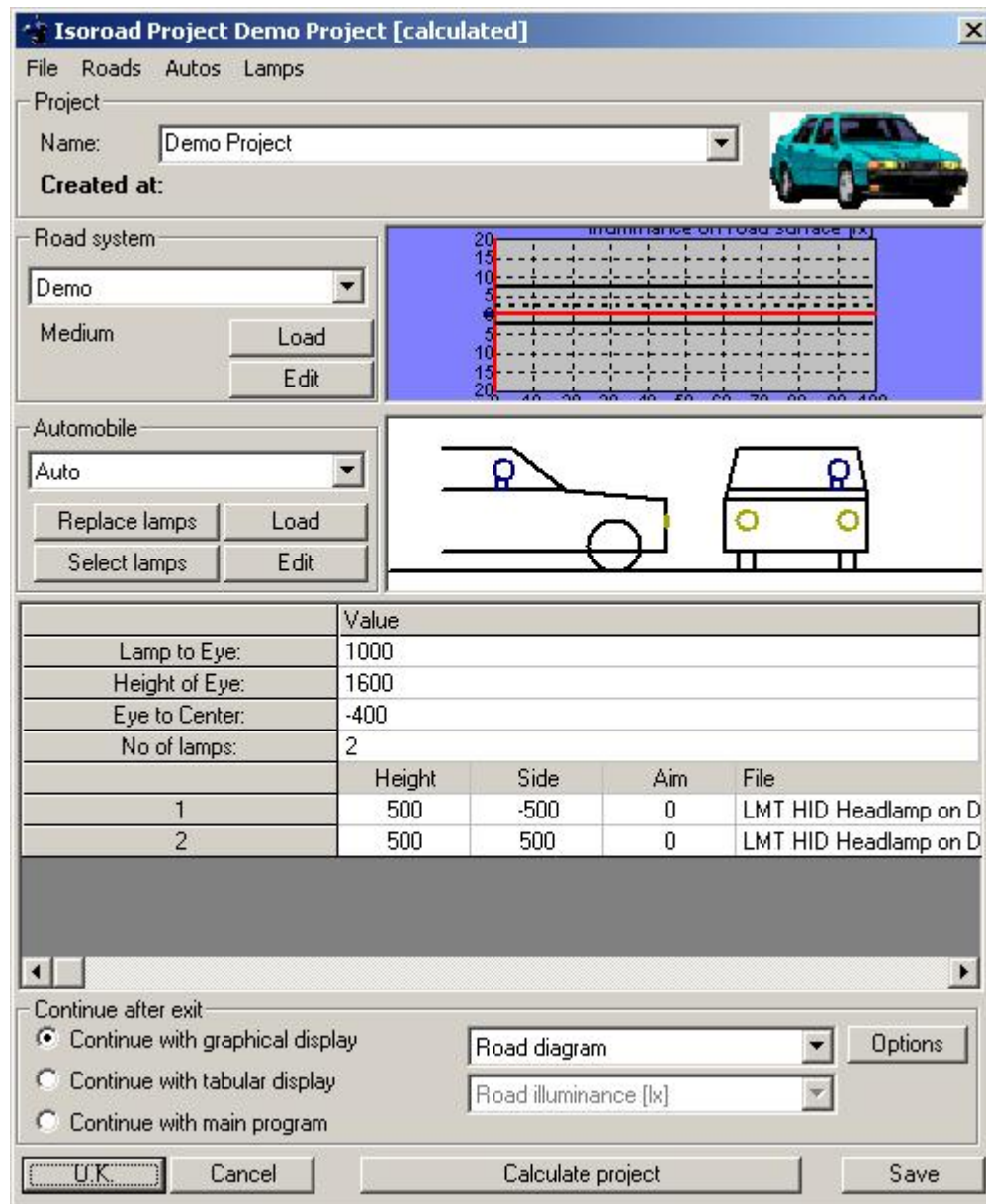
Short form project editor

Project: Allows to select an existing project or the input of a project name.

Load road: Loads a road system from the road database

Edit road: Allows to modify the selected road system by using the road editor window.

Load auto: Loads an automobile system from the automobile database

Edit auto: Allows to modify the selected automobile system by using the automobile edit window.

Select lamps: A pull down menu appears, where each menu shows an available lamp position of the automobile. To select a lamp, click on the menu

> *Note:*
> *If you are not sure which lamp corresponds with the lamp number, click on the lamp circle in the graphic or click on the lamp line in the value table.*

If you have preloaded one or more test sample data files, you can choose the light distribution from the following window:

Light distribution: Click on a name to pre-select

Remove files: Remove open files from the list of preloaded files

Database: Allows to open one or more test sample data files from the test sample database

OK: Accept the pre-selection and continues

Cancel: Throws away the pre-selection and continues

Replace lamps: Allows you to replace a certain lamp type wherever it is installed at the automobile with another lamp (light distribution of a test sample data file)

Continue with graphics: Select the type of diagram you want to see immediately after calculation

Options: You can pre-select isolux values which are used to display the light distribution in an isoroad diagram
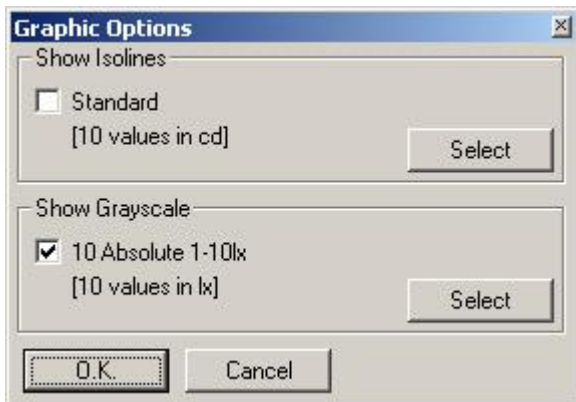
Diagram: You can set the properties of the graphics by clicking on this button
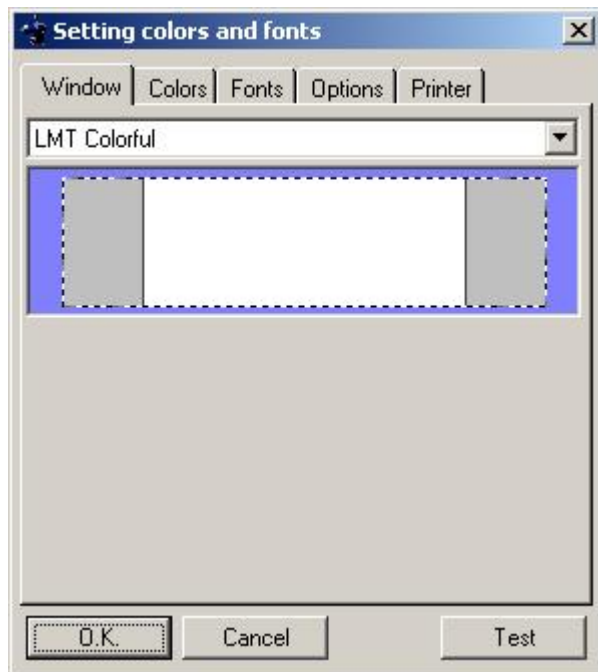
Continue with table: Select the type of table you want to see immediately after calculation

Continue with main program: Just calculate and save, see the results later

Calculate project: Performs the calculation

Save: Saves the project in your project folder

When you save the project, you can specify the project folder. Projects are saved as ASCII files in a special format (extension .lmp)
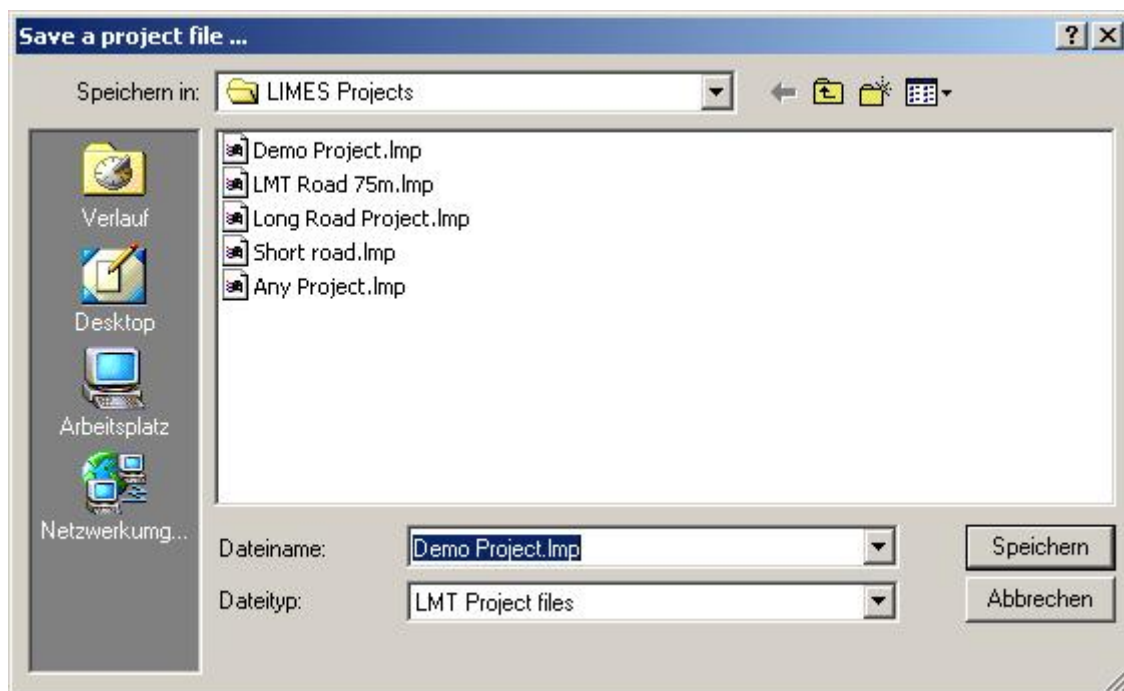
Isoroad diagram

The isoroad diagram appears automatically if pre-selected in the short form editor or the fourth step of the assistant.
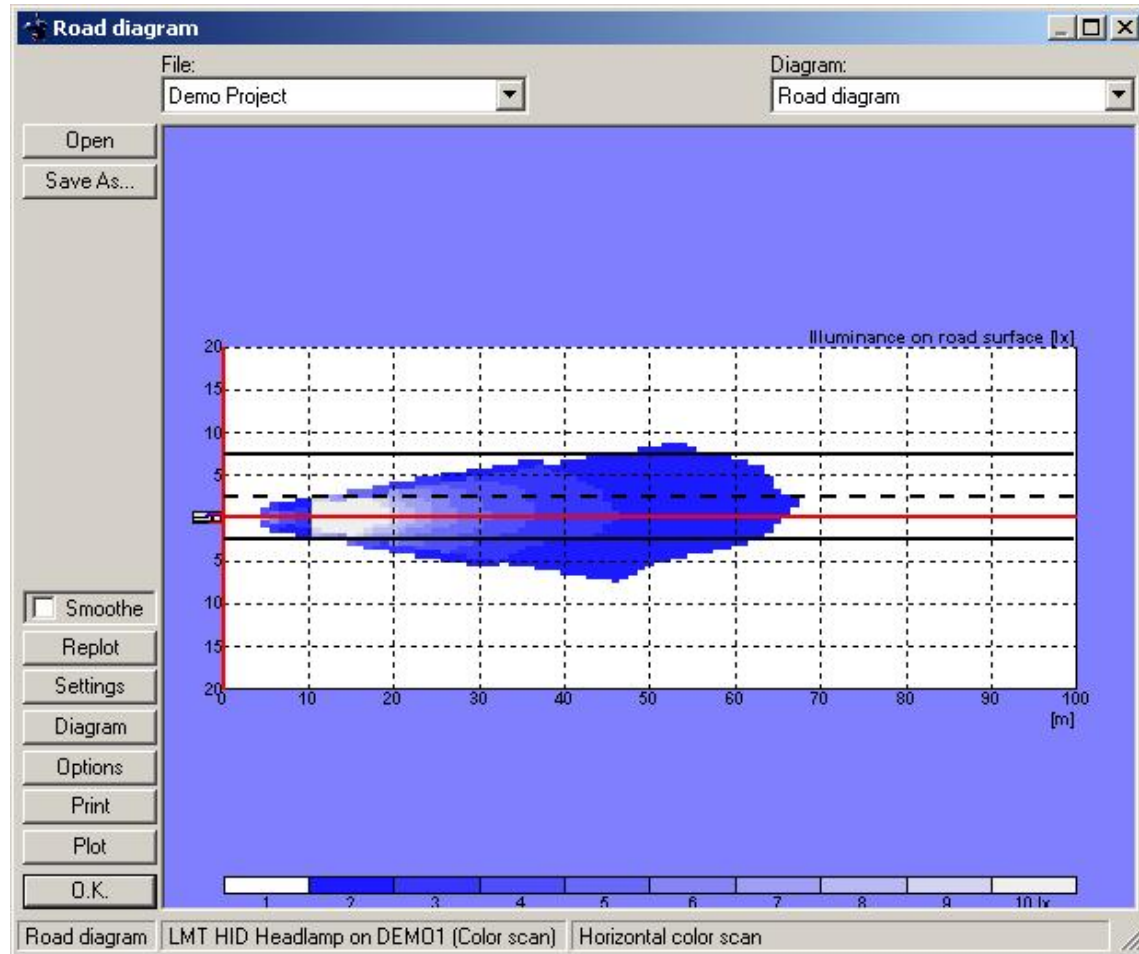
Isoroad diagram

Information about the several buttons on this window are given in the graphical evaluation chapter of the Limes reference manual.

Illuminance table

The road illuminance table appears automatically if pre-selected in the short form editor or the fourth step of the assistant.

WL[lx]	10,00	11,00	12,00	13,00	14,00	15,00	16,00	17,00	18,00
5,50	-	-	-	-	-	-	-	-	-
5,00	-	-	-	-	-	-	-	-	-
4,50	-	-	-	-	-	-	-	-	-
4,00	-	-	-	-	-	-	-	-	-
3,50	-	-	-	-	-	-	-	-	3,524
3,00	-	-	-	-	-	4,697	4,235	4,071	3,916
2,50	-	-	6,966	6,044	5,826	5,291	4,751	4,600	7,949
2,00	1,060	8,457	8,011	6,930	6,603	10,672	9,598	9,238	8,779
1,50	1,063	9,709	15,701	13,799	12,897	11,683	10,591	9,863	9,199
1,00	2,135	17,721	16,651	14,577	13,781	12,467	11,170	10,639	9,984
0,50	2,165	20,138	18,393	16,270	14,760	13,325	12,103	10,944	9,951
0,00	2,249	19,264	17,473	15,791	14,449	13,068	11,792	10,868	10,009
-0,50	2,243	19,037	17,144	15,731	13,882	12,783	11,931	10,629	9,609
-1,00	2,287	17,754	15,459	14,360	12,624	11,532	10,688	9,557	8,621
-1,50	1,141	8,609	13,501	12,752	11,014	10,243	9,781	8,636	7,762
-2,00	1,113	7,755	6,625	6,216	5,352	9,031	8,434	7,516	6,780
-2,50	-	-	6,016	5,535	4,821	4,393	4,113	6,908	6,234
-3,00	-	-	-	-	-	4,075	3,730	3,356	3,046
-3,50	-	-	-	-	-	-	-	3,220	2,903
-4,00	-	-	-	-	-	-	-	-	-
-4,50	-	-	-	-	-	-	-	-	-
-5,00	-	-	-	-	-	-	-	-	-
-5,50	-	-	-	-	-	-	-	-	-

Illuminance table

Information about the several buttons on this window are given in the tabular evaluation chapter of the Limes reference manual.

Solltragweiten

Solltragweiten-Datenbank

Die Solltragweiten-Datenbank enthält alle Parameter, die für die Berechnung und Darstellung der Solltragweiten erforderlich sind, und erlaubt die Änderung (Editieren) dieser Parameter. Jede Konfiguration (Zusammenstellung) von Parametern kann unter einem frei wählbaren Namen gespeichert werden,. Ein weiterer Parameter mit der Bezeichnung „Zweck" erlaubt die Auswahl und Gliederung verschiedener Solltragweiten-Systeme.

Die Parameter werden mit dem folgenden Fenster bearbeitet:, das vom Hauptmenü aus geöffnet werden kann, aber auch bei der Auswertung von Lichtverteilungsdateien unmittelbar zur Verfügung steht.

Solltragweiten Eigenschaften

Im Einzelnen stehen folgende Bereich zur Verfügung:

| Eigenschaften | Tabellen | Optionen |

Parameter

Abstand zwischen Signal und Ausrichtpunkt Ea: `500` m

Höhe des Ausrichtpunktes zur Gleisoberkante Aga: `3,2` m

Signalhöhe 4,2 Hs min: `4,7` m   4,7 Hs max: `7,925` m

Augenhöhe 3,8 Ag max: `3,8` m   2,2 Ag min: `2,2` m

kürzester hor. Abstand zw. Signal und Gleisachse Fa: `3` m

Abstand des Lokführes von der Gleisachse Lfs: `0,9` m

Krümmungsradius Rmin: `1000` m   R max: `9999999` m

Gleisüberhöhung `0` m   Uemin: `0` m

Spurweite Spw: `1,4` m

Signalaufstellung
- ● Rechts
- ○ Links

Gleiskrümmung
- ● Rechts
- ○ Links

☐ Verwende erweiterte Berechnung

Die einzelnen Parameter werden durch die voranstehenden Beschreibungen erklärt. Eine Optionsbox erlaubt die Durchführung von Berechnungen in der erweiterten Form.

Eigenschaften:

Die Parameter werden in die jeweiligen Textfelder eingegeben

Solltragweiten Tabellen

Eigenschaften | Tabellen | Optionen

Sollwerte

Nr.	R[m]	I[cd]	Alpha1	Beta1	Alpha2	Beta2
1	10	3,3	4,97	36,86	29,25	11,78
2	15	7,5	3,26	28,82	20,35	7,71
3	20	13	2,40	24,85	15,43	5,68
4	35	40	1,30	19,57	8,75	3,10
5	50	80	0,86	17,21	5,99	2,06
6	75	185	0,52	15,00	3,82	1,26
7	100	330	0,34	13,53	2,74	0,86
8	150	740	0,17	11,35	1,64	0,46
9	200	1300	0,09	9,53	1,10	0,26
10	250	2000	0,03	7,87	0,77	0,14
11	300	2900	0,00	6,27	0,55	0,06
12	350	4000	-0,02	4,71	0,40	0,00
13	400	5300	-0,04	3,17	0,28	-0,04
14	500	8300	-0,07	0,11	0,11	-0,10

Entfernung: [____] m   Lichtstärke: [____] cd

[Ersetzen]   [Einfügen]   [Löschen]

Tabellen:

Die Sollwerte für die Abstände und zugehörigen Lichtstärken können in dieser Form eingegeben und verändert werden. Die Anzahl der Werte ist beliebig. Nach jeder Änderung werden die Werte der Winkel Alpha1, Beta1, Alpha2 und Beta2 neu berechnet und sofort dargestellt

Solltragweiten Optionen
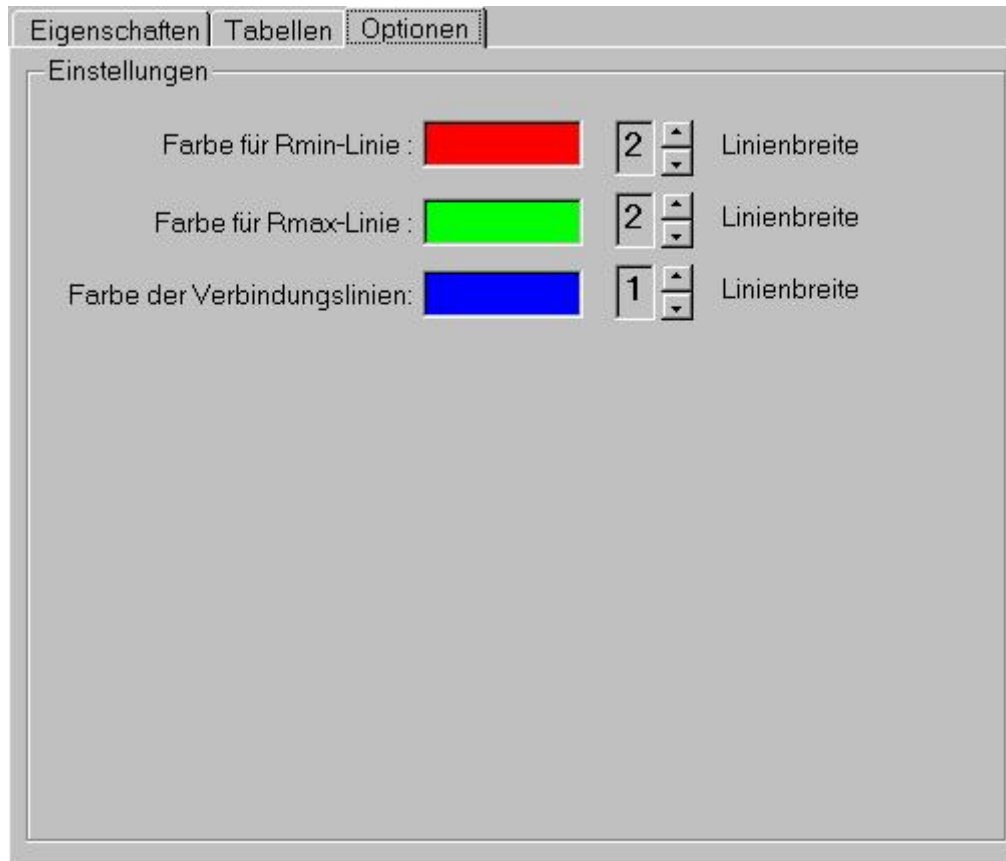
Optionen:

Hier können die Darstellungsoptionen geändert werden (Strichstärke oder Linenbreite und Linienfarbe).

Isocandela-Diagramm

Die Lichtverteilung wird im Isocandela-Diagramm dargestellt. Es können wahlweise nur Iso-Linien und/oder Füllfarben verwendet werden, die frei wählbar sind.

Auf Wunsch können die Grenzkurven mit eingezeichnet werden, wie im Beispiel gezeigt:
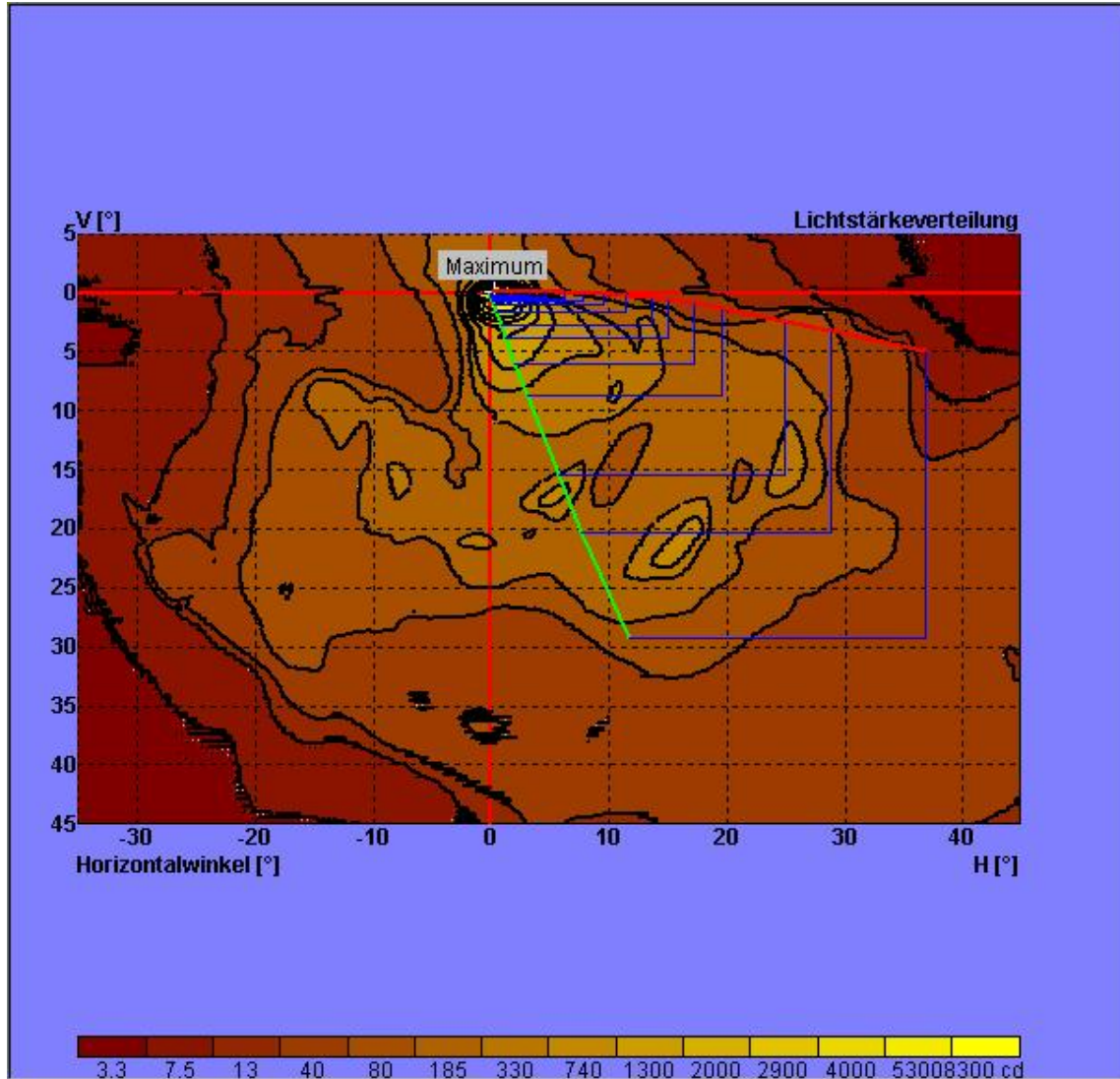
Es können auch nur Ausschnitte dargestellt werden:
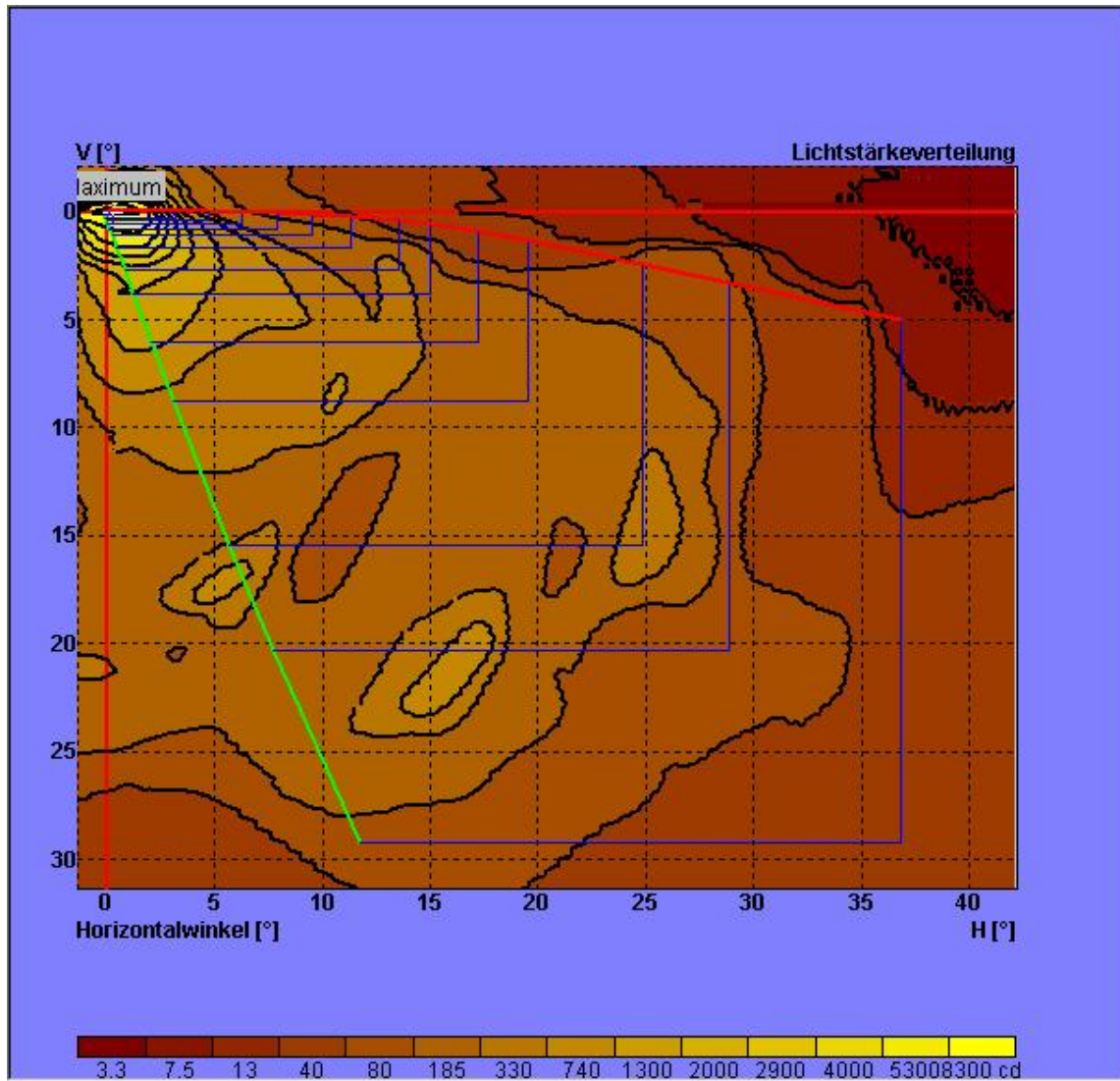
Solltragweiten-Diagramm

Die Solltragweitendiagramme können ebenfalls in Farbe dargestellt werden. Die Bildschirmdarstellung ist in Ihrer Größe skalierbar. Das Diagramm kann gedruckt oder als Graphik-Datei gespeichert werden. Ein maßstabsgetreuer Ausdruck kann bei entsprechend vorhandenem Windows-Drucker oder –Plotter durch Einstellungen der Ränder und Diagrammgröße erzeugt werden.
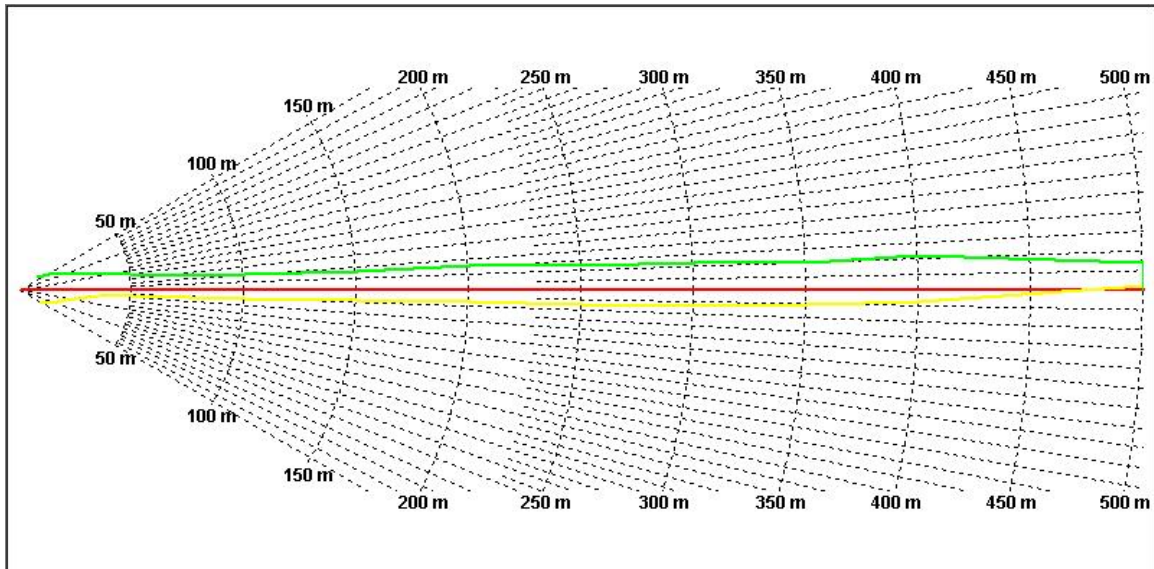
Solltragweiten-Tabelle

Die Ergebnisse der Solltragweitenberechnung können auch tabellarisch dargestellt und ausgedruckt werden.

Nr.	R[m]	I[cd]	Alpha1	Beta1	Alpha2	Beta2	B1s	B2s
1	10	3,3	2,06	25,26	13,71	16,89	-29,58	37,28
2	15	7,5	1,30	19,19	9,14	10,96	-22,33	29,17
3	20	13	0,92	16,13	6,80	8,05	-12,53	20,78
4	35	40	0,43	11,99	3,76	4,34	-4,58	12,00
5	50	80	0,23	10,08	2,54	2,87	-3,03	7,74
6	75	185	0,08	8,21	1,58	1,72	-2,53	4,89
7	100	330	0,00	6,92	1,11	1,15	-2,29	4,15
8	150	740	-0,08	4,91	0,63	0,57	-1,78	3,29
9	200	1300	-0,11	3,18	0,39	0,29	-1,51	3,20
10	250	2000	-0,14	1,56	0,25	0,11	-1,52	2,54
11	300	2900	-0,15	0,00	0,15	0,00	-1,34	2,31
12	350	4000	-0,16	-1,54	0,08	-0,08	-1,03	2,04
13	400	5300	-0,17	-3,06	0,03	-0,14	-0,76	2,22
14	500	8300	-0,18	-6,09	-0,04	-0,23	0,21	1,38

Translator

Start Translator

General

The LIMES Translator program (executable file, Items.exe), after normal installation located in the folder \Program files\Lmt\Limes2000, is only one component of the LIMES 2000 program system, which usually also includes the other programs Limes (executable file Limes.exe) and LimesControl (executable file LimesControl.exe). The translator program can also be started from the Limes program menu Translate, which is a submenu of the Extras menu.

Program start

The Limes Translator program can be started usually by

- ❑ Double clicking on the Translator icon automatically created on the desktop from the installation program or
- ❑ Selecting the Limes 2000 menu from the WINDOWS start menu
- ❑ Double clicking on the Items.exe file in the WINDOWS Explorer
- ❑ Using the Execute menu of the WINDOWS start menu and entering the proper path to Items.exe

When the program is started from the Windows desktop, the Welcome screen appears for a couple of seconds.

Note:
The Welcome window is not displayed, if the program is started from the Limes program

LIMES Language concept

The LIMES program has been designed to be operated in any available language. This means that all text information displayed during program execution and all printed text in a graphic or table report can be in any of these languages.

Languages can be western style, like English, German, French, or Italian. Also Asian style languages are supported, like Chinese, Japanese, or Korean.

> *Note:*
> *Asian style languages are only supported if the operation system allows the display of characters in these languages. This means that for example you must have installed a Chinese Windows version to be able to translate to Chinese or display Chinese characters in the LIMES programs*

Language does not really mean the real language in the usual sense. A language can also be customized, or can be created as "MyOwnLanguage".

Languages also do not need to be translated completely. If a translation for a certain text line of info message is missing, the LIMES program will display this text in the pre-selected alternative language. Only if the alternative language does not contain a proper translation, the default programmed text (usually in English) is used.

LIMES Items databases

General

LIMES Items databases are Microsoft Access compatible database, which contain the text used for display on the computer screen or print in any graphic or table report. The database contains the information in tables for two different purposes:

- ❑ Screen text
- ❑ Info text

Screen text contains of one single line (sentence or single word) for one item. The info text however contains of a single headline (sentence or single word like the screen text), but an additional text associated with the headline. This additional text can contain of multiple lines, and can also contain line breaks (or carriage returns, by pressing the enter key in a text form).

Info text is especially used to display messages (informative or warnings) during program execution.

Screen text and info text are handled separately, by selection from the Options menu.

Screen text

The screen text can be organized by pre-selecting forms. This allows the user to work only with text items which are used by a certain form (or window) in the LIMES programs. The screen text can be edited therefore in total (All forms) or for each individual form.

Screen text lines can have a maximum size of 255 characters.

Screen text is also used for menus in the LIMES program. As Microsoft Windows allows to underline a letter in the menu text, so that the user can select this menu in the running program by using the keyboard (pressing the Alt key plus the letter), also in the text items this function can be invoked. To do so the user has to enter a "&"-sign before the character to be underlined.

Example:

To underline the letter "F" in the menu "File" you have to enter "&File"

Info text

Info text is used for messages during program execution. Info text head lines can have a maximum size of 255 characters. The additional text is unlimited in its size.

Note:
As the additional text is displayed in a message box, and the width of this box is defined by the length of the longest text line, it is recommended to use reasonable line lengths by inserting carriage returns by pressing the enter key at proper positions.

Sometimes these messages shall contain text, which is only available in the running program. For this text the user has to enter a wild card consisting of 2 characters "%" followed by the number of the text reference.

Example:

The message shall display:

  The file C:\LMT LIMES 2000\Data\MyDatabase.mdb is not available

As the text message cannot contain the file name, which appears only in the running program, the text item for this message looks like this:

  The file %%1 is not available

The wildcard "%%1" will later be automatically replaced in the running LIMES program.

Perform translation

We assume that you have already selected and opened the Items.mdb file in which you want to do the modifications.

To modify translated text the following steps are necessary:

- ❑ Select the destination language from the list of available languages (the language which contains the text you want to change)
- ❑ Select the source language from the list of available languages (the language you want to use as the basis for the translation)
- ❑ If you want to translate screen text, but the source and destination text areas show info text or form names, select Options from the menu and then Screen text
- ❑ Click on the item in the source or destination text area which you want to change. The selected item appears in the translation area
- ❑ Click in the translation area. Change the text as you like.
- ❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list
- ❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.
- ❑ To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text.

Click here to get more information about translation of screen text

Click here to get more information about translation of info text

Click here to get more information about translation of form names
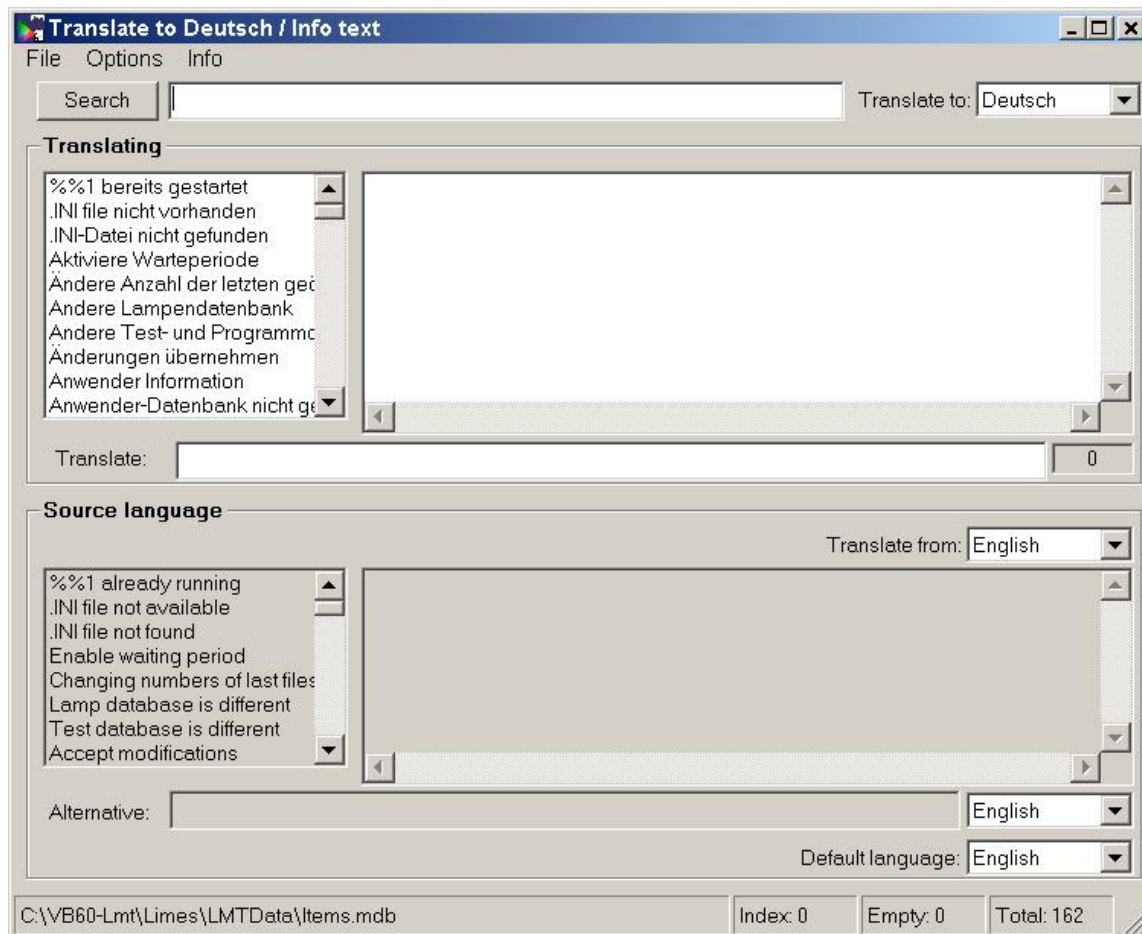
Translate screen text

Items which have not been translated, appear as "~" characters in the text lists.

Translate LIMES screen text:

❑ Click on the item in the source or destination text area which you want to change. The selected item appears in the translation area. If the destination item was empty, the translation area text box is cleared.

❑ Click in the translation area. Change the text as you like.

❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

Translate Info text

Translate LIMES info text:

- ❑ Click on the item in the left list of the source or destination text area which you want to change. The selected item appears in the translation area

- ❑ Click in the translation area. Change the text as you like.

- ❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

- ❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

If the message you want to translate is completely empty (has not been translated before), first translate the headline of the message. The headlines are displayed in the left lists of the source or destination area, the associated message in the right list. Finish the translation of the headline by pressing the return key or the arrow keys up or down.

To translate the message click on the headline list of source or destination area, where the headline has been translated. Then click into the right window and enter the message.

Note:
You can use the enter key in this window to perform a carriage return (line feed) of the message text

When you are finished with entering the text of the message, click onto an item of the headline list in the left window. This accepts the input of the message text.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

Translate form names

Translate LIMES form names:

Translating the form names has no effect on the LIMES software itself. It only allows to select special forms of the LIMES software for translation, by displaying the form list in the same language.

- ❑ Click on the item in the source or destination text area which you want to change. The selected item appears in the translation area

- ❑ Click in the translation area. Change the text as you like.

- ❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

- ❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

Reference Manual

Main Window

The LIMES Translator program displays the main window after start.

566
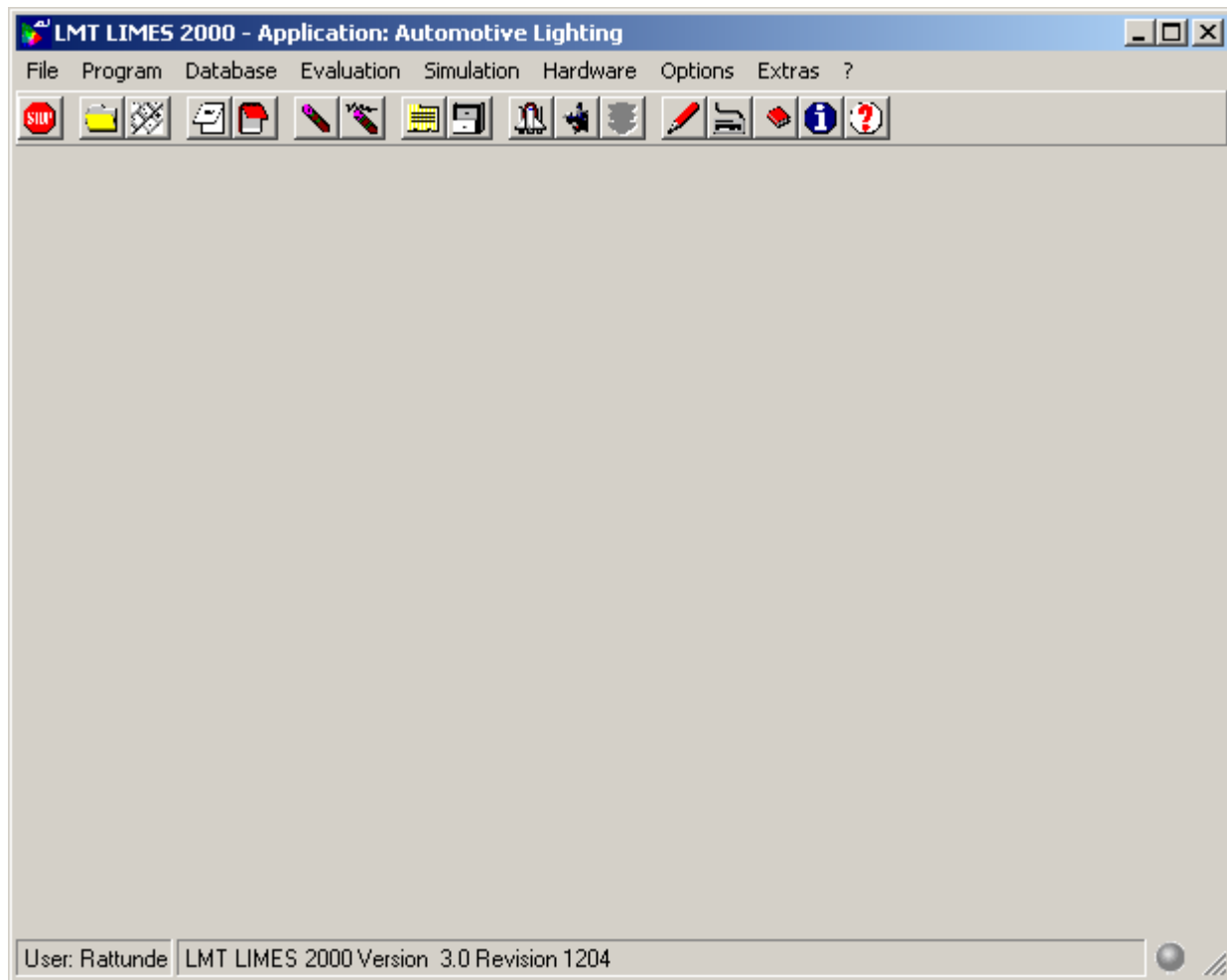
In windows help mode, you can click on the interesting area on the graphics above to show the explanations.

You can resize this windows for your needs, either by the following methods

- ❑ Use the maximize icon on the top right corner

- ❑ Move the mouse over the separator area between the destination and the source text area. Hold down the left mouse key and drag the separator area to resize the ratio between destination and source area

- ❑ You can also change the ratio between the left and the right fields if you translate info text

Menu bar

The Translator program can be controlled by pull down menus on top of the window. The menu bar has three visible items:
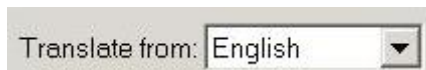
❑   File

❑   Options

❑   Info

Status bar

You will find this option on the Translators main window.
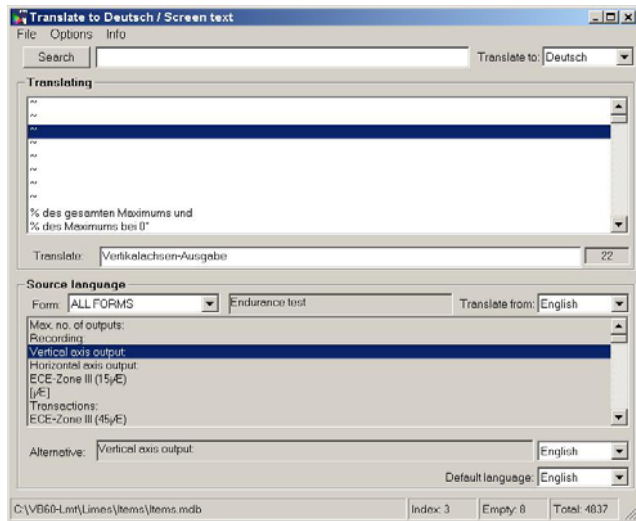
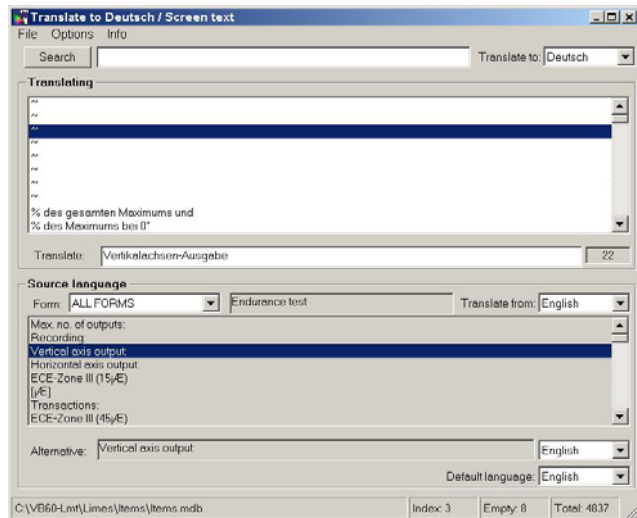Use the information displayed in Translator main window to find the location of this tool.
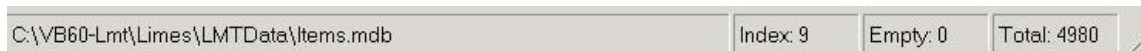
The status bar shows the following information:

- ❑ Path and file name of the actual items database you are working with
- ❑ The order number of the item in the list
- ❑ The number of items which have not been translated in the destination area text lists (empty)
- ❑ The total number of items for translation in the source area text list

File menu

File menu

The file menu allows the ser to select the items databases for translation.
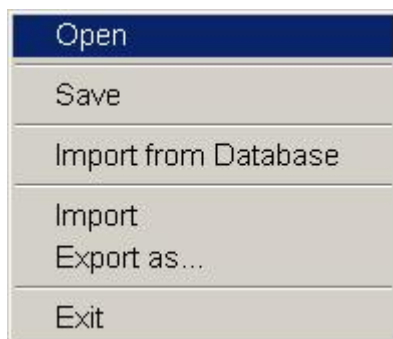
The file menu ha the following menus:

- ❑ Open: Open a new Limes items database
- ❑ Save: Save modifications into the actual database after translation
- ❑ Import from database: Allows to import items from other Limes items databases

- ❑ Import: Allows to import items from special formatted items text files
- ❑ Export as … :Allows to export items by creating a special formatted items text file
- ❑ Exit: This exits the program

Open database

After selecting Open from the file menu a Windows explorer appears and allows the user to search for and open another Limes item database.

Save

Selecting save from the file menu saves all modifications into the actual database. As long as the modifications are not saved, they are lost when the program terminates.

When you attempt to terminate the program after you have made any modifications to the translation, you will be asked whether you want to save your modifications. Confirming with Yes or O,K will save all modifications into the actual database. This has the same effect as selecting Save from the menu.

Import from database

You can import items from another LIMES Items database file, e.g. if you have downloaded the latest version provided by LMT or by updating your LIMES software. After clicking on the Import from database menu the Import window appears.
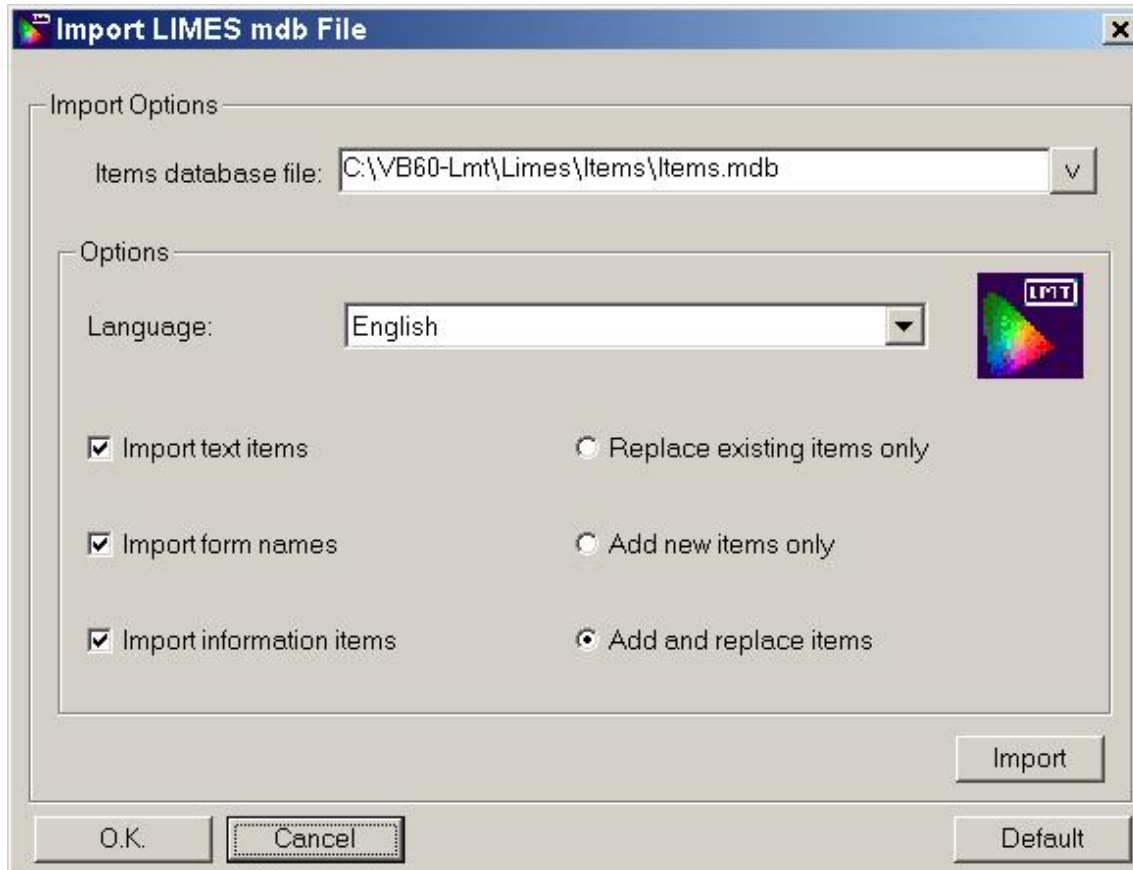
Items database file: Select the location of the file from which you want to import

Options language: Select the language from which you want to import

Import text items: Mark this if you want to import screen text items

Import form names: Mark this if you want to import form names

Import information items: Mark this if you want to import info text items

Replace existing items only: Select this option if you want to replace only items which exists in your items database by the imported items of this language

Add new items only: Select this option if you want to add only new items which did not exist in your items database in this language

Add and Replace item: Select this option if you want to add new and replace existing items in your items database of this language

Default Click on the default button to set the default options

Click on Import button to start the items import. The database file is scanned for items and the results appear in the Result area.
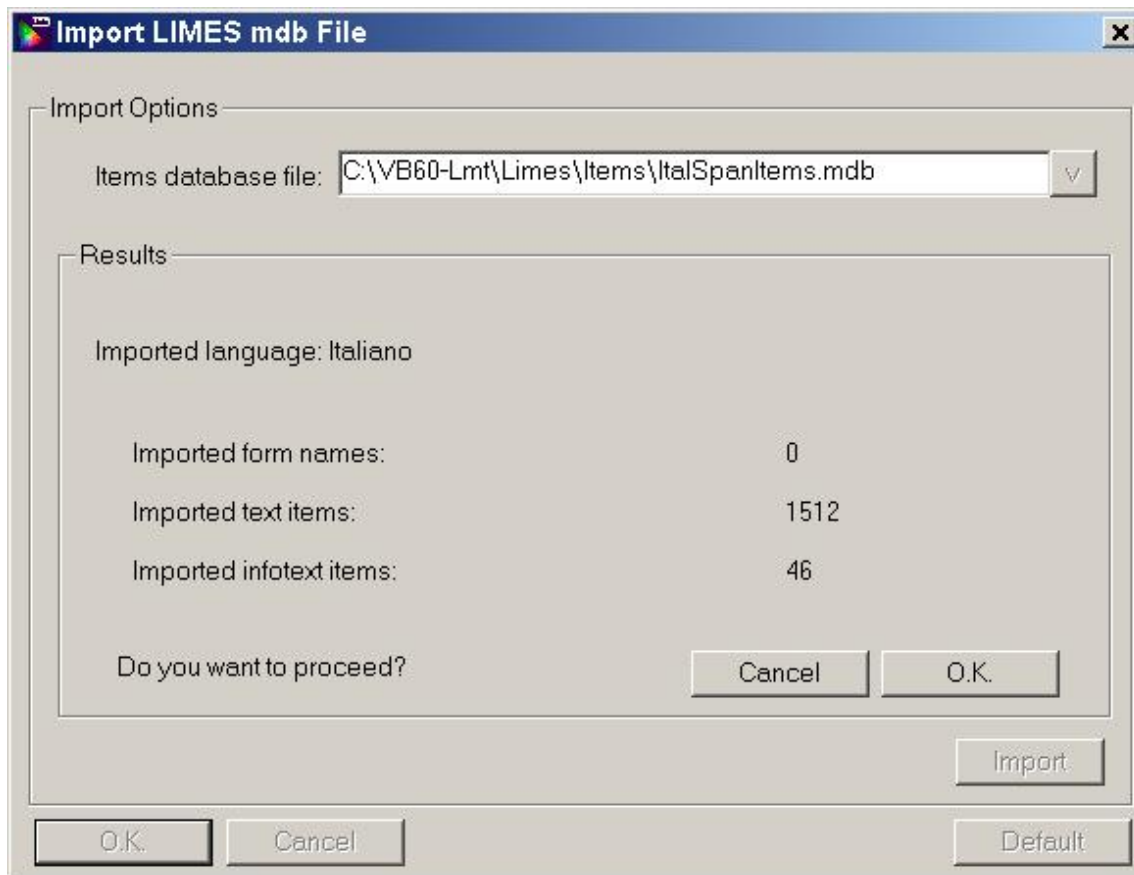
To continue click on O.K.

To cancel click on Cancel

Import from text file

You can import items from a special LIMES Items text file, e.g. which wacreated by this or another Translator program using the Export menu. After clicking on the Import from text file menu the Import window appears.
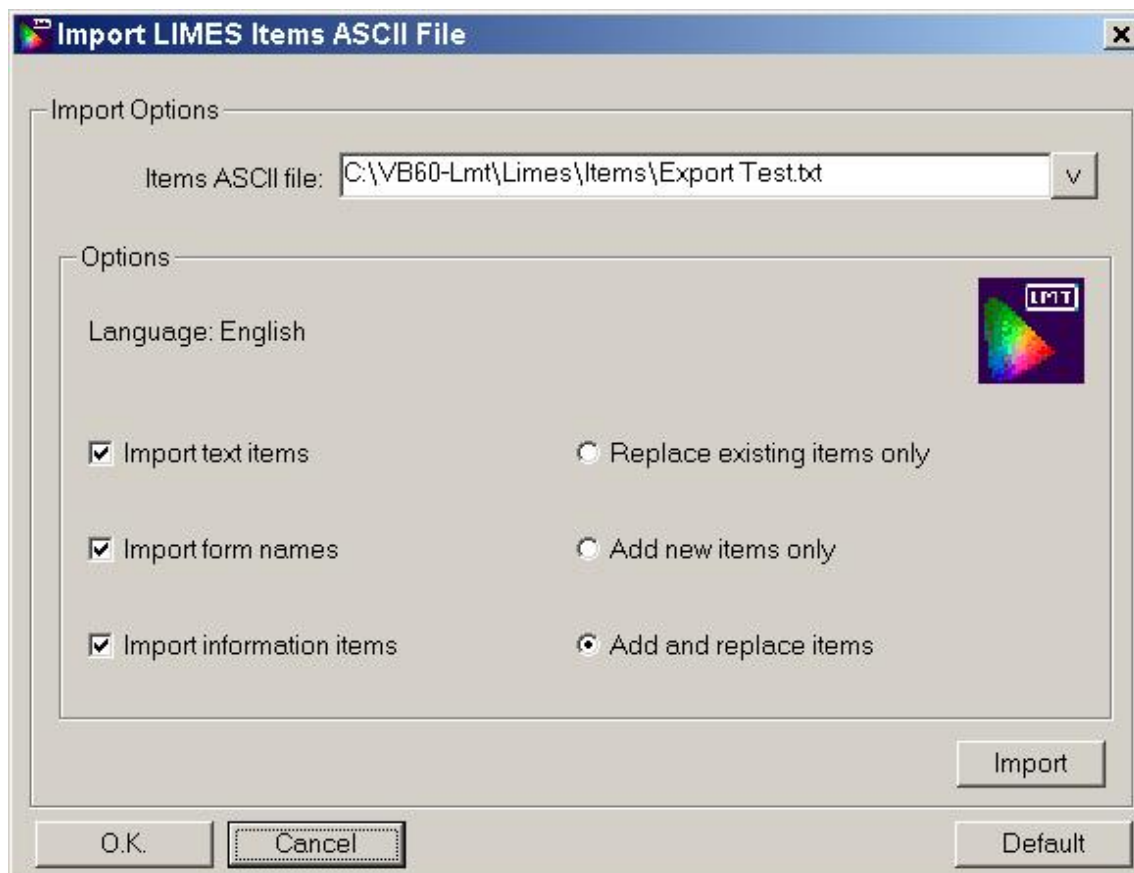
Items ASCII file: Select the location of the items text file from which you want to import

Options language: Select the language from which you want to import

Import text items: Mark this if you want to import screen text items

Import form names: Mark this if you want to import form names

Import information items: Mark this if you want to import info text items

Replace existing items only: Select this option if you want to replace only items which exists in your items database by the imported items of this language

Add new items only: Select this option if you want to add only new items which did not exist in your items database in this language

Add and Replace item: Select this option if you want to add new and replace existing items in your items database of this language

Default Click on the default button to set the default options

Click on Import button to start the items import. The text file is scanned for items and the results appear in the Result area. See more about this in Import from databases.

Export to text file

You can export selected items to a special formatted text file (ASCII format). You can do the translation manually using a text editor, and then re-import the translation into the database using the Import menu.
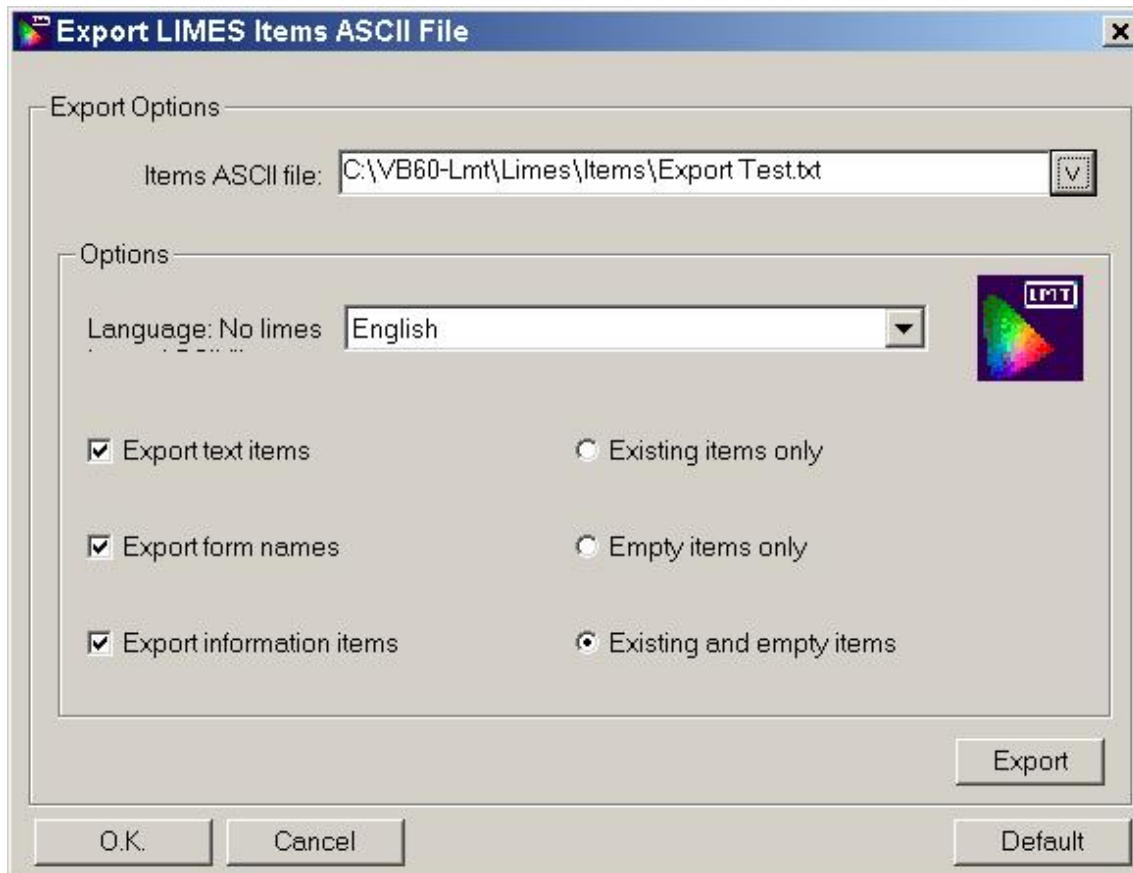
See more details about the options in Import from database.

Exit program

Click on the Exit menu will terminate the program. If you have modified any translations, you will be asked to save before termination.

Options menu

Options menu

The options menu allows you select special settings from translation

The options menu has the following menus:

- ❑ Screen text: Allows to translate or edit individual text lines which are displayed anywhere in the Limes programs
- ❑ Info text: Allows to translate or edit the content of message boxes, which appear anywhere ion the Limes programs
- ❑ Form names: Allows to change the names of Limes windows. This has no effect on the Limes programs, but supports the translation
- ❑ Sort by Destination Sorts both source and destination text lists according to the alphabetical order of the destination list
- ❑ Sort by Source: Sorts both source and destination text lists according to the alphabetical order of the source list
- ❑ New language: Allows the user to create a new language table in the Items database
- ❑ New language name: Allows the renaming of existing language names
- ❑ Delete language: Completely removes a language table from the Items database
- ❑ Save settings: Saves the actual settings of the Translator program into the Windows registry

Translate screen text

Items which have not been translated, appear as "~" characters in the text lists.

Translate LIMES screen text:

❑ Click on the item in the source or destination text area which you want to change. The selected item appears in the translation area. If the destination item was empty, the translation area text box is cleared.

❑ Click in the translation area. Change the text as you like.

❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

Translate Info text

Translate LIMES info text:

- ❑ Click on the item in the left list of the source or destination text area which you want to change. The selected item appears in the translation area

- ❑ Click in the translation area. Change the text as you like.

- ❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

- ❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

If the message you want to translate is completely empty (has not been translated before), first translate the headline of the message. The headlines are displayed in the left lists of the source or destination area, the associated message in the right list. Finish the translation of the headline by pressing the return key or the arrow keys up or down.

To translate the message click on the headline list of source or destination area, where the headline has been translated. Then click into the right window and enter the message.

Note:
You can use the enter key in this window to perform a carriage return (line feed) of the message text

When you are finished with entering the text of the message, click onto an item of the headline list in the left window. This accepts the input of the message text.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

Translate form names

Translate LIMES form names:

Translating the form names has no effect on the LIMES software itself. It only allows to select special forms of the LIMES software for translation, by displaying the form list in the same language.

❑ Click on the item in the source or destination text area which you want to change. The selected item appears in the translation area

❑ Click in the translation area. Change the text as you like.

❑ To accept the translation you can press the enter key. The modified text appears in the destination text area, and the selection moves automatically to the next item in the list

❑ You can as well use the arrow keys up and down. This also accepts the translation, and moves the selection automatically either upwards or downwards in the list depending of the arrow key.

To save the medications into the database, select Save from the file menu, or simply terminate the Translator program. You will be asked to save your modifications if you have changed any text

New language

You can create a new language or rename an existing language name in the list of your items database.

For the name the following rules apply:

- ❑ You cannot use blanks (spaces) in the name
- ❑ You cannot use other characters than the standard ANSI alphabet in the name
- ❑ You can use numbers, but the name must start with a letter
- ❑ You can use uppercase and lowercase letters, but the first name must be uppercase
- ❑ You are not restricted to use "real" language names, like English, French, or Italian, but you can also create your own names, like MyOwnLanguage, Bavarian, or LMTSpecial

When you have entered a proper name, it will be displayed again for confirmation.

If you confirm with O.K., the language will be created.

Delete language

You can delete an existing language from your items database. By deleting all translated items (if any) are deleted from the database too.

Note:
You cannot delete the language "English" from the database
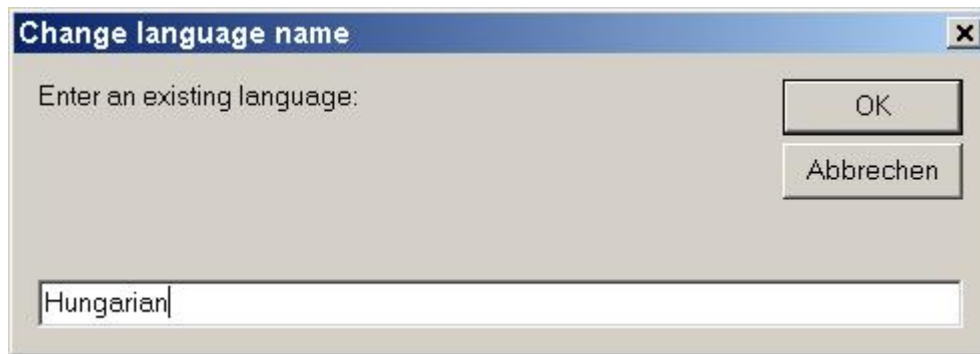
if the name you entered does not exist, you get a message.

If the language exists, you have to confirm to delete.

If you confirm with Yes, the language and all items of it are deleted from the actual items database.

Save settings

You can save your settings into the windows registry. When you restart the Translator program the next time, you will find the same settings again and you can easily continue with your translation work where you finished it the last time. The settings are

❑ The actual database file

❑ The used path and file names for import and export

❑ The languages for source, destination, alternative, and default

❑ The sizes and positions of your window and the window regions

Note:
The settings are automatically saved when you terminate the Translator program

Info menu

Info menu

The info menu allows the user to select help and information.

Help: This menu starts to display the Windows help for the Translator program

About: This menu displays title and version of the Translator program

Control tools

Select source language

You will find this option on the Translators main window.
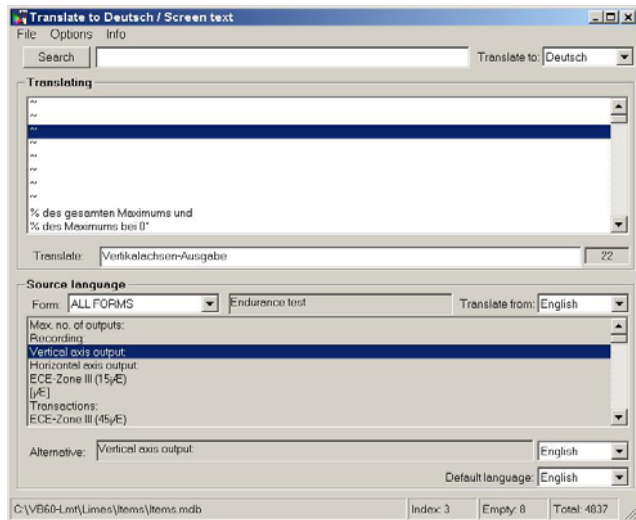
Use the information displayed in Translator main window to find the location of this tool.

Select the source language (the language you want to translate from) by clicking on the drop down list.

Select destination language

You will find this option on the Translators main window.

Use the information displayed in Translator main window to find the location of this tool.

Select the destination language (the language you want to translate to) by clicking on the drop down list.

Select alternative language

You will find this option on the Translators main window.
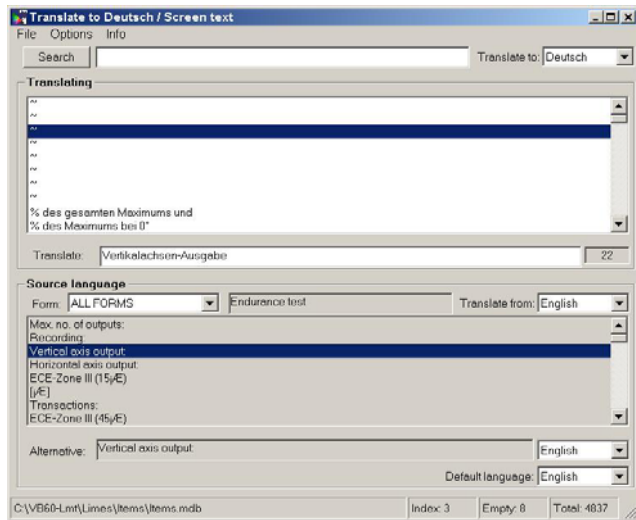
Use the information displayed in Translator main window to find the location of this tool.

Select the alternative language (the language you want to see additionally) by clicking on the drop down list.

Select default language

You will find this option on the Translators main window.
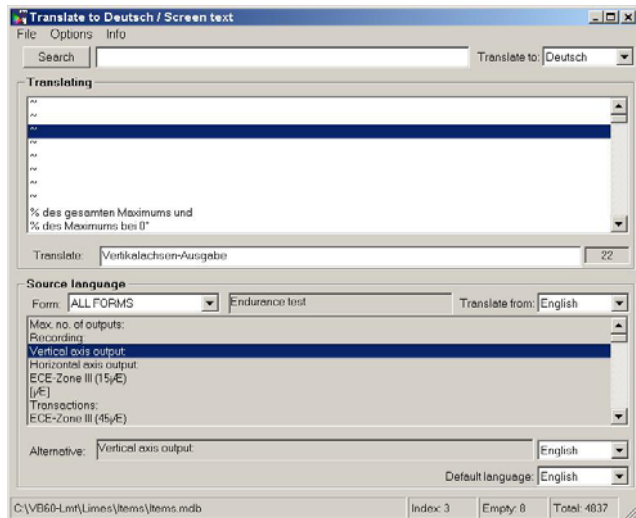
Use the information displayed in Translator main window to find the location of this tool.
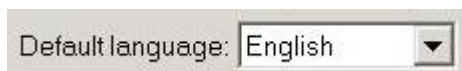
Select the default language (the language you want use for the operation of the Translator program) by clicking on the drop down list.

Select form

You will find this option on the Translators main window.
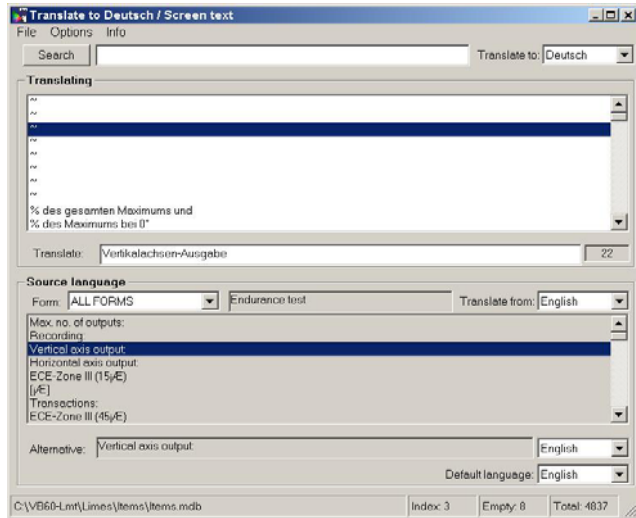
Use the information displayed in Translator main window to find the location of this tool.

Select the LIMES form in which you want to make modifications by clicking on the drop down list. Select All forms if you want to see the total list of all text items available in the source language.

When you click onto an item of the source or destination text, the name of the form which created this item appears in the field right to the form select drop down box.

Source text

You will find this option on the Translators main window.
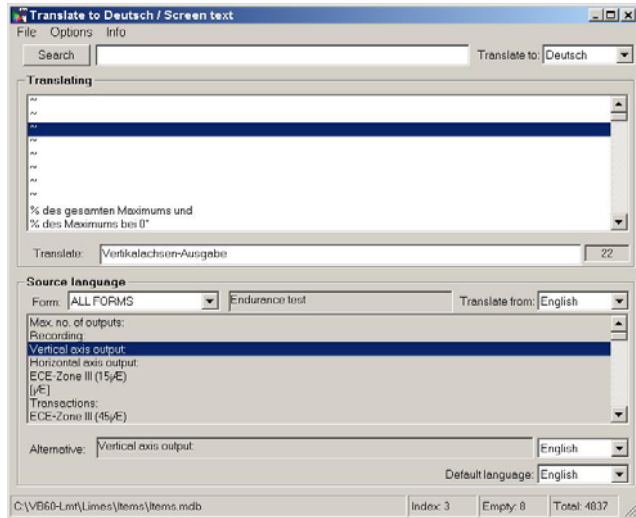
Use the information displayed in Translator main window to find the location of this tool.

The source text area is the lower area on the main window.

The source text area contains the listing of the text, from which you want to translate into another language.

The text in the source text area can be sorted alphabetically. In this case the text in the destination text area is reordered by the order of the source text.

Destination text

You will find this option on the Translators main window.
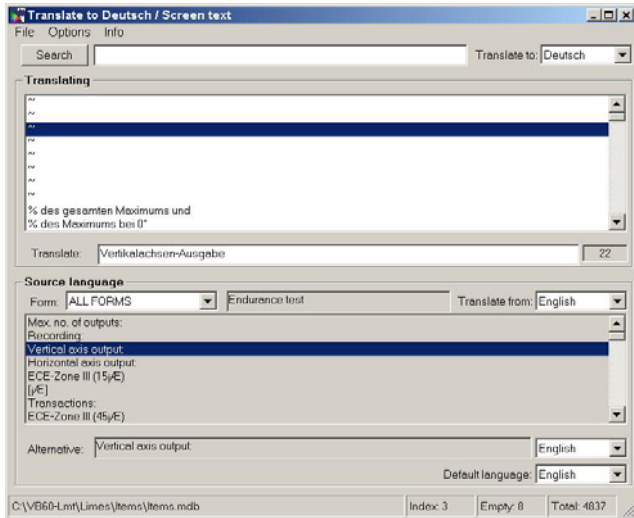
Use the information displayed in Translator main window to find the location of this tool.

The destination text area is the upper area on the main window.
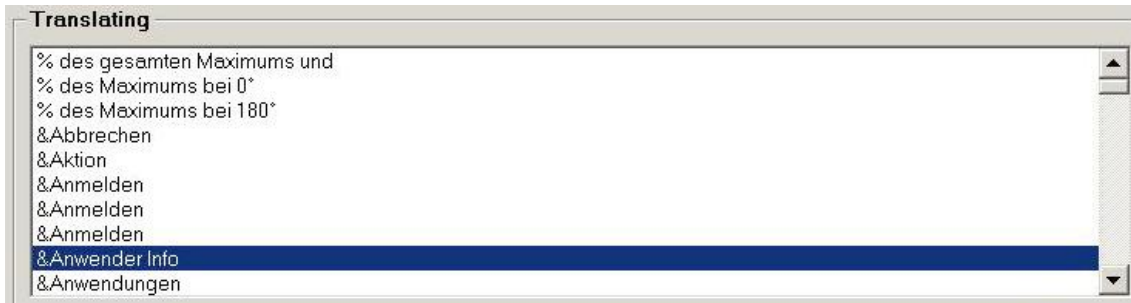
The destination text area contains the listing of the text, which was translated from the source language.

The text in the destination text area can be sorted alphabetically. In this case the text in the source text area is reordered by the order of the destination text.

If no destination text is available, a short "-" character is displayed.

Alternative text

You will find this option on the Translators main window.
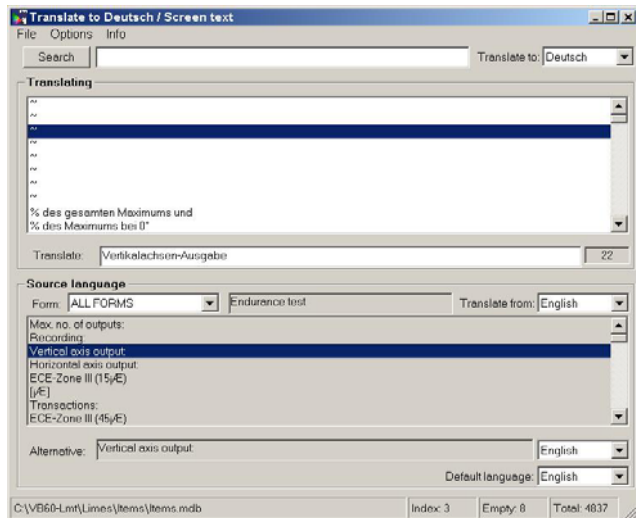
Use the information displayed in Translator main window to find the location of this tool.

The alternative text area appears below the source text area.

The alternative text area contains the actual selected line of the source or destination text area, as it was translated into the alternative language.

If no alternative text is available, a short "-" character is displayed.

Translate text line

You will find this option on the Translators main window.
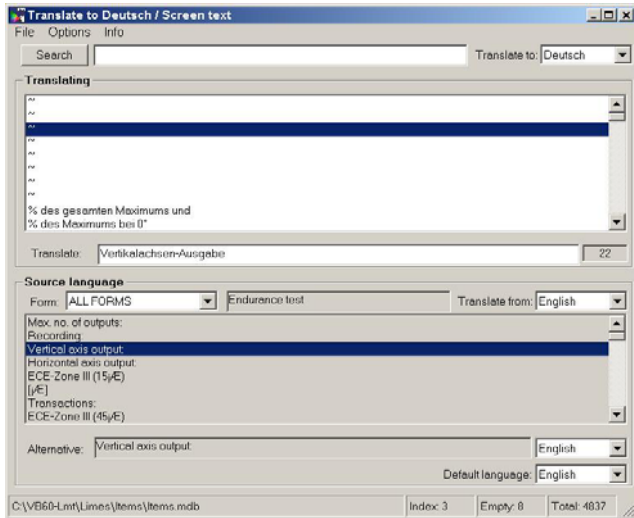
Use the information displayed in Translator main window to find the location of this tool.
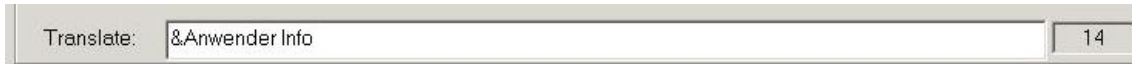
For translation enter the text into this line. The length of the line (number of characters) appears in the small field right beneath the input field.

Tips:

- ❑ Try to keep the length of the translated text nearly the same as the length of the original source text
- ❑ Press F5 key to take the source text into the translate text line
- ❑ IF you need to translate the same (or nearly the same) text a second time, you can simplify the procedure by Windows copy and paste

Windows Copy and Paste:

- ❑ Click on the text which you have already translated. The translated text appears in the translate text line
- ❑ Click into the translate text line. The whole text in this line is marked
- ❑ Press the Ctrl and C keys on the keyboard at the same time (Windows Copy)
- ❑ Click on the other line, which was not translated. The translate text line is empty
- ❑ Click into the translate text line
- ❑ Press Ctrl and V at the same time (Windows Paste)
- ❑ The copied text is inserted into the translate text line
- ❑ Press the Enter key or the arrow keys up or down to accept the new text

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Search for text

You will find this option on the Translators main window.
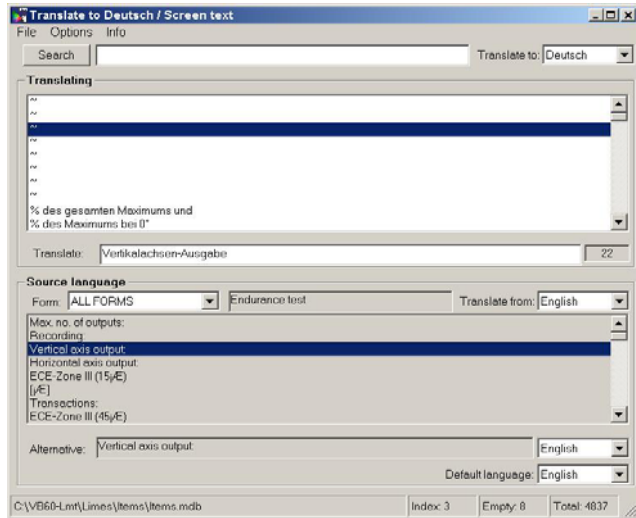
Use the information displayed in Translator main window to find the location of this tool.

To search for a certain text in the items list, you can to simple or extended search.

Simple search

Enter the text you want to search into the search text field. The list where you are going to do the search is changing its background color to yellow.

Press on the F3 key to perform the search

Extended search

You can also enter the text you want to search into the search text field. The list where you are going to do the search is changing its background color to yellow.

Click on the search button to perform the search.
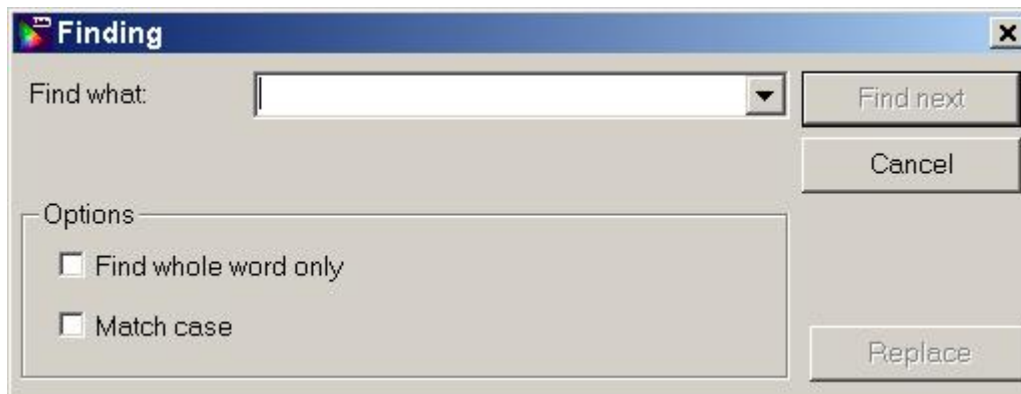
Find what: Enter the text you want to search for into the text box

Options Find whole word only: Mark this if you want to find a complete word

Options Match case: Mark this if you want to find the text in the same style with uppercase and lower case letters

Find next: Click here to start or continue the search

> *Note:*
> *You can start or continue the search with the F3 key*

Replace: Search for a word and replace it with the text in the Replace text box

When the search reaches the end of the file, a message is displayed.

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