flora-mate

LIGHT DIMMER

 http://www.leiderdorpinstruments.nl/ http://www.flora-mate.nl/

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1 Introduction

With the **flora-mate** light dimmer you can create nice sun rise and sun set effects in your aquarium, terrarium or aviary.

Light levels can be set separately for each of the 4 channels, and for each 30-second period. This gives an unprecedented flexibility in the design of the light effects.

Not only can you program an almost exact reproduction of the light conditions on any place on the earth, you can also consider mixing different colored lamps and use the 4 channels to make the color of the light change during the day. The possibilities are limited only by your imagination.

Programming the **flora-mate** light dimmer is made easy by the user-friendly PC software that you can download for free from the **flora-mate** website ***www.flora-mate.nl*** A USB interface is used to connect the dimmer to your PC. The PC software automatically detects the dimmer, and you can send the new light program to the dimmer with the click of a button. You can also set the light levels directly from the PC, for manual operation. For normal every-day operation the PC is not needed and can be disconnected.

The flora-mate light dimmer was designed to be used with dimmable electronic control gear with a 1-10 Volt control input.

1.1 Functions

- Four separate channels, individually programmable.
- User-friendly PC software to design the light program, and to transfer it to the dimmer.
- High resolution dimming, both in time and in light level. A new level can be programmed for each time slot of only 30 seconds, and light levels can be set accurate to 1%.
- Total duration of the light program can be up to 17 hours. After that the last level is maintained.
- The dimmer has the possiblity for a separate calibration for each of the four channels.
- Direct manual control from the PC is possible.

1.2 Operations principle

The flora-mate light dimmer operates as follows:

- The lamps and the electronic control gear are switched on and off with a timer. This is probably the situation before the **flora-mate** light dimmer is installed, and nothing is changed in that respect. The timer stays, and is used to switch the mains supply to the lamps on in the morning, and off at night.

- An adapter, that is also plugged into the timer that swiches on the mains supply to the lamps, is used to supply power to the **flora-mate** light dimmer. When the light dimmer is powered on, it knows that it must start the light program.

- Next, the light dimmer executes the light program that is has stored in its internal memory. This light program is nothing more than a large table that contains a light level for each of the 4 channels, for each 30-second timeslot following power-on of the dimmer.

- The dimmer takes care of sun rise and sun set effects during the day, following the light program that was previously stored in the dimmer using the PC and the PC software.

- Once the light cycle is complete, the timer can be used to switch off the mains supply to the lamps. During the night, the lamps are completely switched off, and the dimmer is also powered down.

- The following morning, the timer once again switches the lamps and the dimmer back on, and the cycle repeats itself.

2 Installation

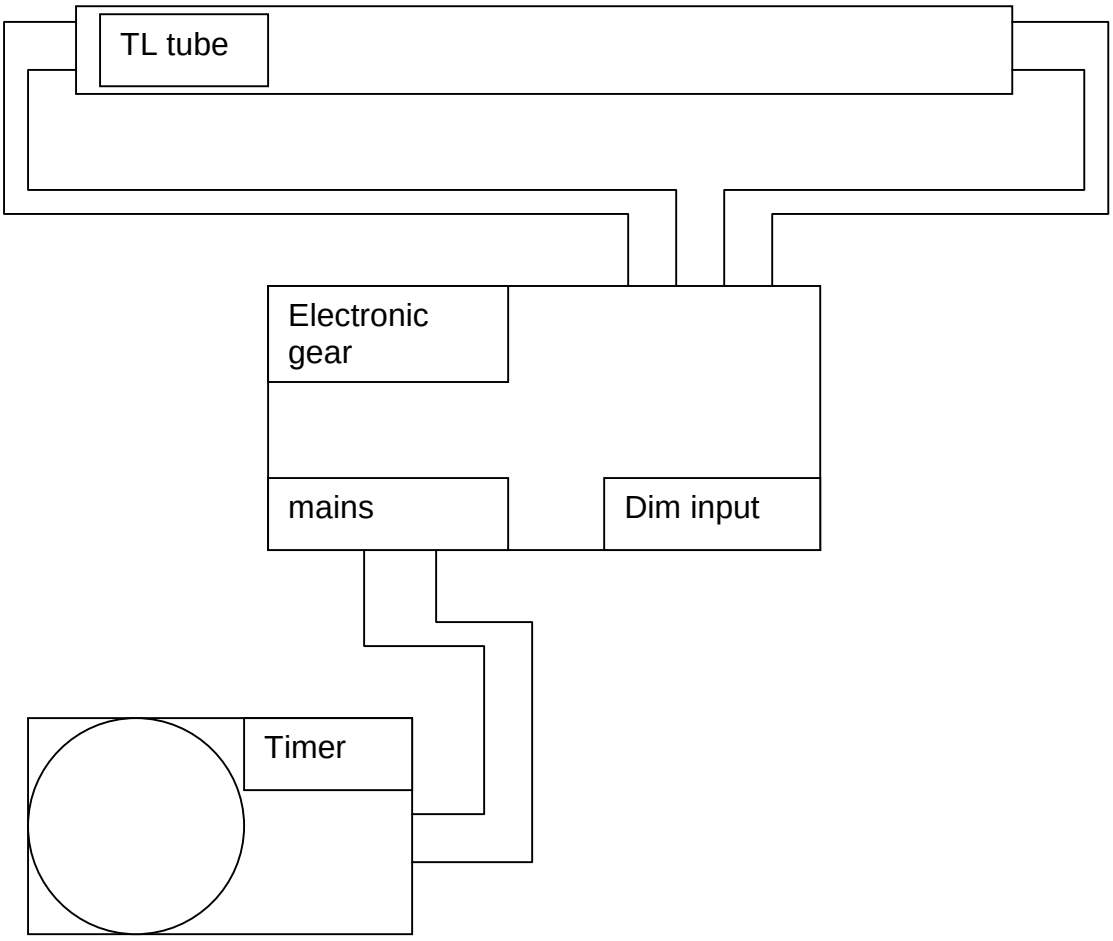
Installation is easy and straight forward. Of course, dimmable electronic gear must be installed.

1. The lamps probably are controlled by a timer already. This does not change. The adapter for the dimmer is simply also connected to the timer that switches the lamps on and off.

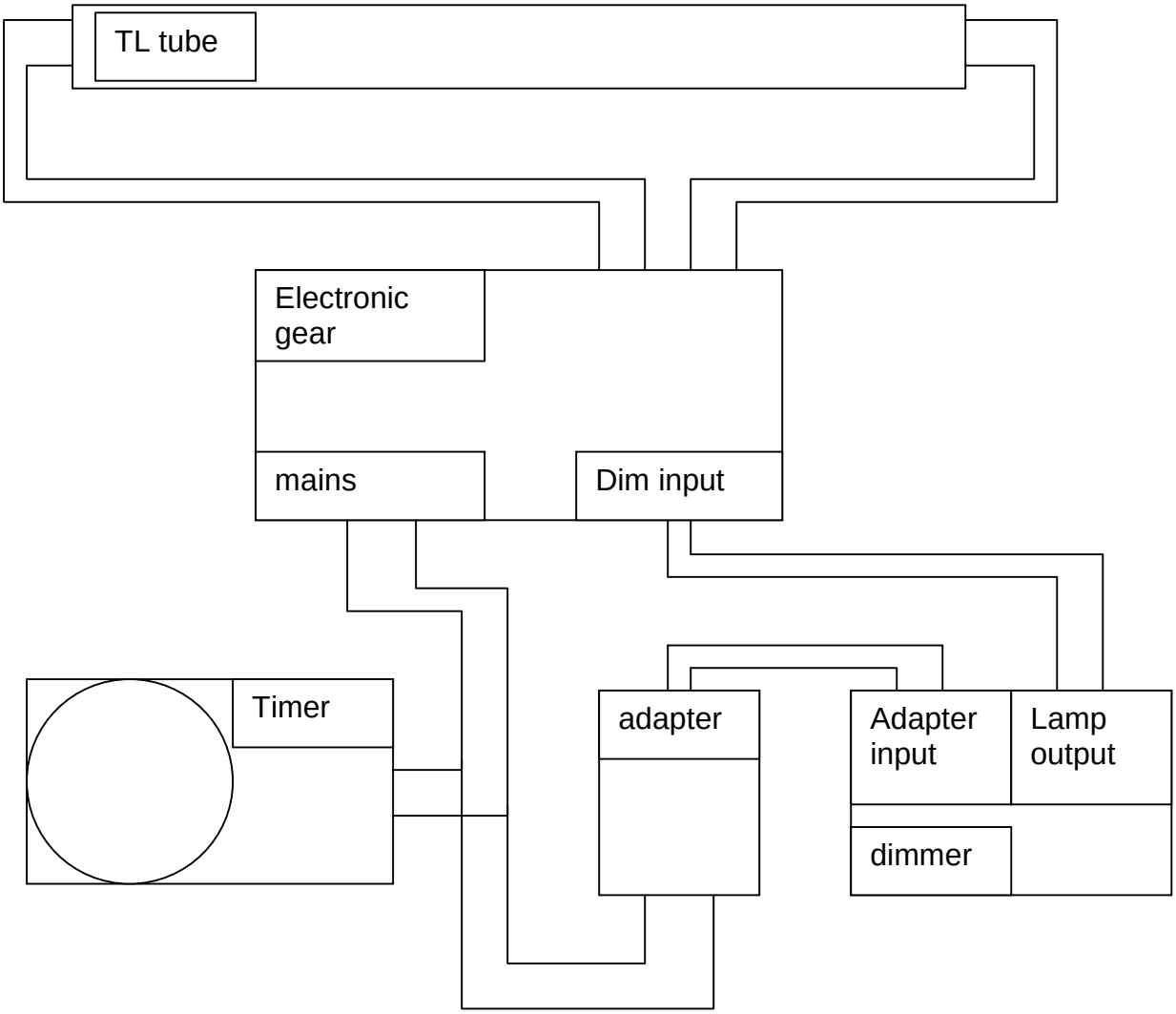
2. The control output of the dimmer is connected to the control input of the electronic gear.

Done. Nothing more needs to be changed in the existing installation.

2.1 Installation without a dimmer



2.2 Installation with dimmer



In this drawing there is only one TL tube, however the dimmer can control 4 tubes independent of each other. All lamps and the dimmer can be switched by the same timer.

2.3 Crimp connectors

The dimmer has terminals that mate with crimp connectors. These are metal connectors that are crimped onto a wire using a crimp tool. The dimmer comes with pre-assembled cables so usually you do not need any additional connectors nor a crimp tool. However, should you need it, the connectors and the crimp tool are probably available at your local DIY, usually for a conveniently low price.

The connectors are size 4.8 x 0.8 mm. The color is used to show the thickness of the wire that will fit into the connector. For the dimmer we advise the red connectors, for wire gauges of 0.5 .. 1.5 mm^2.

2.4 Adapter

The dimmer requires a DC adapter with an output between 8 and15 Volt DC. Power consumption of the dimmer is low, no more than 100 mA is required.

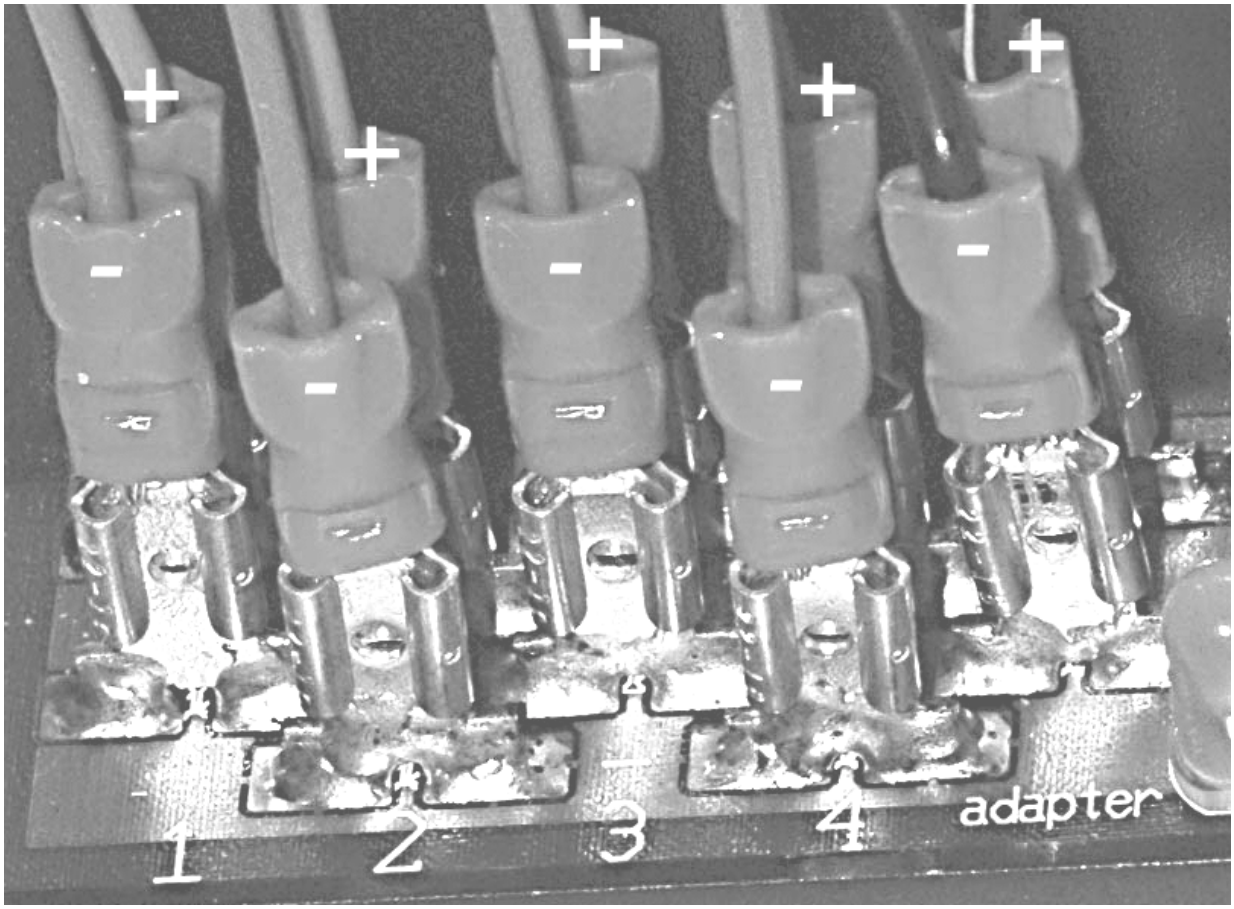
The adapter that can be ordered together with the dimmer has one wire with a white band, the other wire is black. The wire with the white band is the positive (plus) pole.

When the polarity of the adapter is reversed, the dimmer electronics will not be damaged. If the adapter is properly connected and powered, the green LED on the dimmer will light up.

2.5 Connection of the electronic control gear

The dim control inputs on the electronic gear are also connected with the dimmer, using the same type of connectors. On the dimmer, the outputs are marked 1 through 4, corresponding to lamp 1 through 4 in the PC software. These outputs have a plus an a minus contact, which should be properly connected with the plus and the minus on the dim control input on the electronic gear.

If you wish, all the minus inputs from the electronic gear can be connected together, and connected to only one of the minus contacts on the dimmer. On the dimmer, all these minus contacts are internally connected to each other.



3 The light program

The light program is a long table that is stored in the internal memory of the dimmer. The table has an entry for each 30-seconds slot. Each entry contains a light intensity value for each of the four lamps.

The length of the table covers 17 hours. As soon as the dimmer is powered on, it starts at the first entry in the table. Each 30 seconds, the dimmer advances through one entry in the table. After 17 hours, the end of the table is reached. The dimmer will then stop advancing through the table, so that the last values will be used until the dimmer is powered down and powered up again.

The PC software is used to fill out the table and transfer it to the dimmer. Of course, you do not have to enter a value by hand for each 30-seconds time slot. Just fill out a short list that relates specific times of the day to the light intensity values you want at those times, and the PC software will ensure a smooth transition from one light level to the next.

3.1 Connect the dimmer to the PC

The dimmer has a socket for an USB connector. The PC has to run the Windows operation system, version 98ME or later. Connect the dimmer to the PC via a suitable USB cable. The PC will automatically detect the dimmer, and load the required drivers.

Before you connect the dimmer to the PC, you must power-on the dimmer.

Some PC's won't boot when you connect a dimmer that is not powered on. Do not connect a dimmer to the PC when the dimmer has no power.

3.2 Installation of the PC software

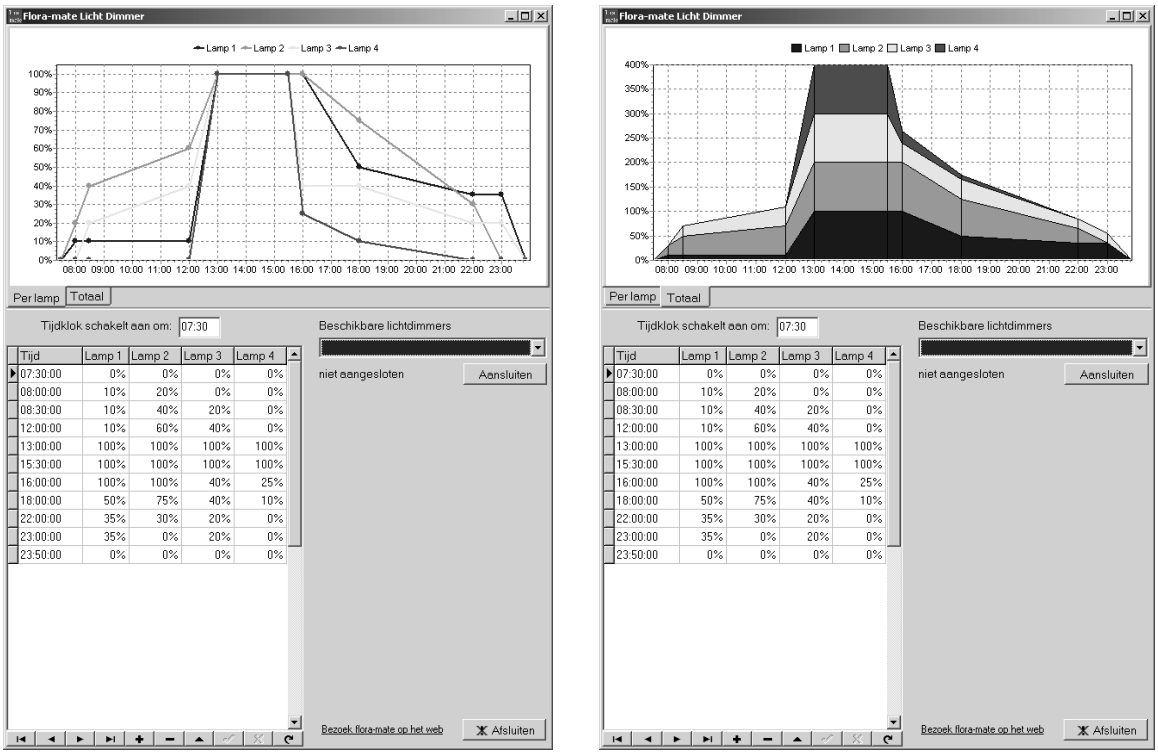
You can download the PC software for free from the **flora-mate** website ***www.flora-mate.nl***

Follow the instructions from the installation program to install the software onto your PC. To run the software, your PC has to run on Windows 89ME or later operating system.

Windows 2000 and Windows XP users must have administrator rights to run the software.

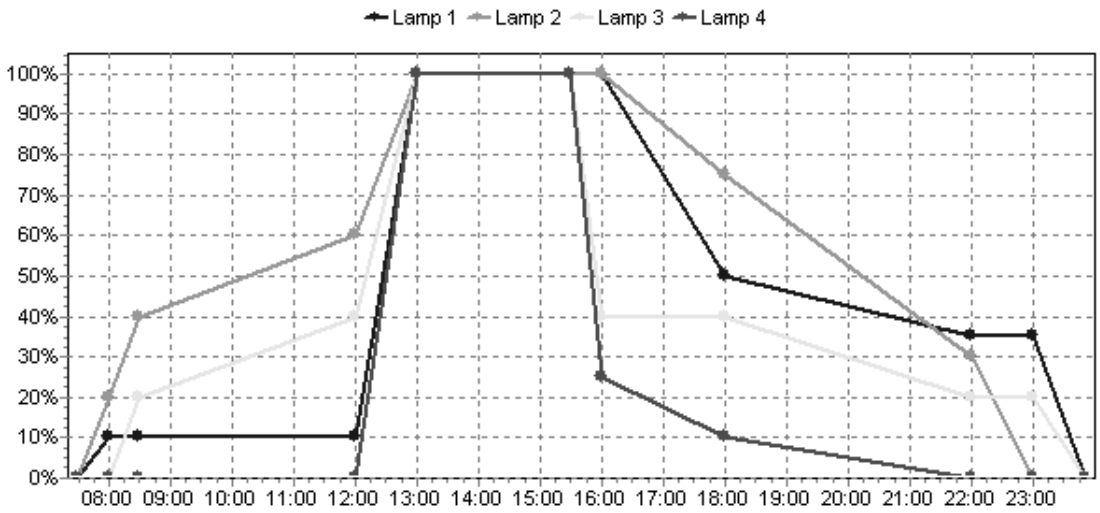
To start the software, use the menu 'Start', Programs, flora-mate, flora-mate Dimmer.

4 The PC software

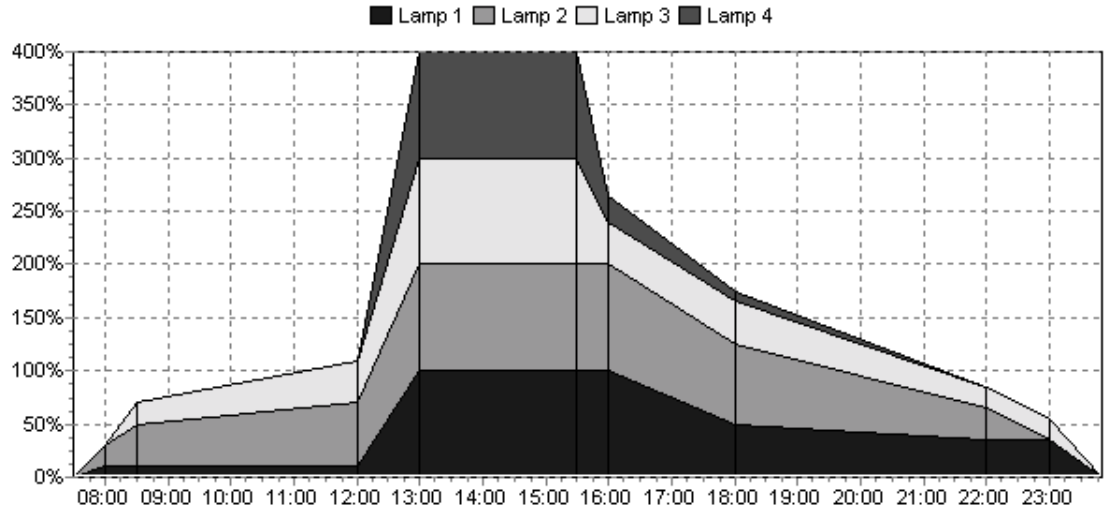


The software shows the light program in two different graphs at the top of the screen. You can enlarge the part of the screen that is used to draw the graphs, by dragging the dividing line between the chart area and the bottom area of the screen.

The light program itself is entered in the table at the bottom left. More about this light program is in paragraph 4.1



The first graph shows the light intensity for each of the lamps separately, during the course of the day.



The second graph is used to show the total amount of light that is generated during the course of a day. For this, the separate light intensity levels from each of the lamps are accumulated. Of course, this only works out well when all lamps are equal.

4.1 How to enter the light program

At first, you enter at which time the timer will switch on the dimmer, and the mains power to the lamps. The PC software uses this time to generate an appropriate table for the dimmer. See above for an explanation of that table.

The dimmer is switched on by the timer, and that is also the time at which the light program for that day will start.

You can then fill in specific times, and the four light intensity levels that you want to have at those times of the day. The software will ensure a smooth transition from one level to the next. Refer to the graphs to see the result of your actions.

If you have less then four lamps, just enter 0% for the light level at these unused outputs.

- Select the table by clicking on it. You can insert a new line in the table by pressing the 'Insert' key on your keyboard. You can also click the PLUS sign on the bar just below the table. A time must be entered completely, in hours, minutes and seconds. The software will not accept an invalid or incomplete time entry.

  It is not important where you enter the new line, the software will automatically sort the table for you.

- You can enter times that are before the time that the dimmer is switched on, or more than 17 hours after the dimmer was switched on. However, those times will not fit into the dimmers internal memory table, and you will get a error message when you try to send that light

program to the dimmer.

- To remove a line from the table, you select that line by clicking on it, and then click the MINUS button on the bar just below the table. Or press Ctrl-Delete key combination on the keyboard.

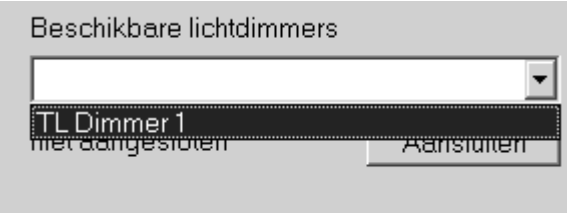
If you wish to do so, you can enter light intensity levels for each 30-seconds time slot. This gives full control over the light sequence. However, usually it suffices to enter just a few times and associated light levels. The software will fill-out the intermediate levels.

The light program that you are working on is automatically saved to a file when you close the PC software. Next time you start the software, the light program that you were last working on, is reloaded. There is also the possiblity to save a light program to a file, and recall that file later.

4.2 Making a connection between the PC and the dimmer.

The connection between the PC and the dimmer is through USB. See above for instructions on how to make that connection.

After the connection has been made, and the dimmer is powered on, you can select the dimmer in the PC software. Note that you can connect more than one dimmer to the PC. If you do so, there will be more than one dimmer to choose from in the pull-down list.



1. Select the dimmer you want to use, from the pull-down list. Then click the button ‘Connect’. The text at the left of that button will change from ‘disconnected’ to ‘connected’.

2. Additional functions that are only available when there is a dimmer connected, will now become visible.

4.3 Transfer the new light program to the dimmer.

Click the tab ‘Programming’ to bring the programming sheet to the front. There is one button on that sheet. Click it. The new light program will be assembled and transferred to the dimmer. You can see the progress on the progress indicator at the bottom of the screen.

Programming will take some time to complete. Do not disconnect or power down the dimmer before programming has finished.

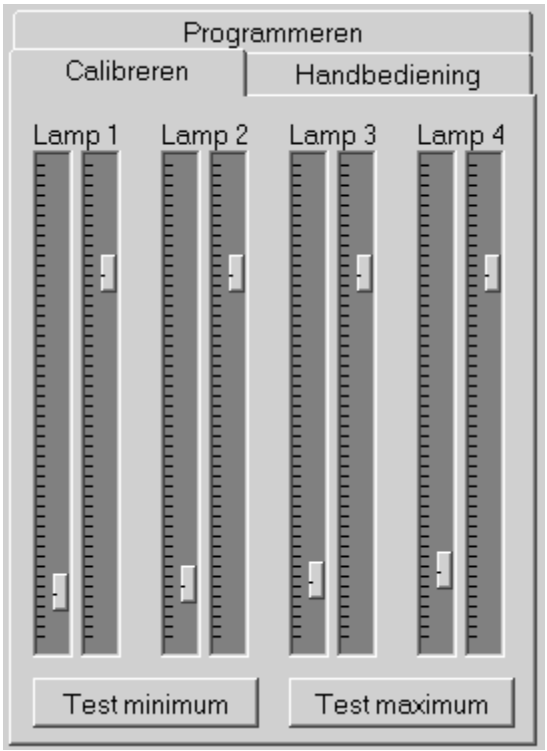
5 Advanced functions

The other two sheets are for Calibration and for Manual control.

5.1 Calibration of the electronic control gear

The gear are controlled by a 1 through 10 Volt control voltage. However, the licht intensity that such a gear produces does not exactly match 0% (actually 1% or 3%) at 1 Volt, and 100% at 10 Volt. Usually the least amount of light is already produced at 4 Volt and 100% at 8 Volt. This is different for various brands of electronic gear.

So, to enable you to more accurately program the light intensities, the PC software has an option to find out, at which voltage level the gear produces the least amount of light that it is capable of, and at which voltage level the gear produces the most amount of light that it is capable of.



Use the sliders to find out at which output voltage levels the gear starts to respond to the dimmer.

With the button ‘Test minimum’ you can swap between actual 0 Volt, and the level that you set with the lefthand slider. Keep the button pressed to send 0 Volt to the gear. Release the button to send the level indicated by the lefthand slider to the gear.

With the button ‘Test maximum’ you can swap between actual 10 Volt, and the level that you set with the righthand slider. Keep the button pressed to send 10 Volt to the gear. Release the button to send the level indicated by the righthand slider to the gear.

- The lefthand slider is moved upwards, until the point where you can see a change in light intensity between the button ‘Test minimum’ pressed, and released.

  The setting for the lefthand slider will be used by the software as the 0% value. Note that zero light output is usually impossible for most gear unless they are powered off. So, in reality, the light will be about 3% (1% for some gear) and not 0%.

- The righthand slider is moved downwards, until the point where you can see a change in light intensity between the button ‘Test maximum’ pressed, and released.

  The setting for the righthand slider will be used by the software as the 100% value.

If you want to stop calibration and resume the normal light program, click the tab ‘Programming’ to bring the programming sheet to the front. It may take up to 30 seconds before the normal light program is resumed..

5.2 Manual control

When connected to a PC, the light levels can be set manually. Click the sheet ‘Manual control’ to show four sliders, one for each of the lamps. Use the sliders to set the light levels. If you want to stop manual control and resume the normal light program, click the tab ‘Programming’ to bring the programming sheet to the front. It may take up to 30 seconds before the normal light program is resumed.